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SEPTEMBER, 1939

61st Year Vol. 61, No. 9

NEW LOW PRICES on G-E Automatic Heat!

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G-E's new low prices on Oil Fired Automatic Heating Equipment can now bring to your houses all of G-E's *added* sales appeal at a price no higher than you'd ordinarily pay for automatic heating.

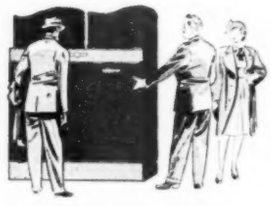
Your prospects don't have to be "sold" on G-E Automatic Heat. The name *General Electric* is recognized everywhere as representing the utmost in thrifty, dependable home heating.

Now that it costs no more, why not let G-E Automatic Heat help close the sale of *your* houses? G-E offers builders not only a complete line of automatic heating equipment, but also special cooperation and advice on specific heating problems. Put the *plus value* of G-E in *your* houses.

General Electric Company, Division 190-111, Bloomfield, N. J.

When prospects see this monogram, they know you built the house not just to sell, but to be LIVED IN!

New G-E Oil or Gas Furnaces for radiator heated houses provide clean, trouble-free heat plus abundant hot water, winter *and* summer. Prospects will be glad to hear how little G-E units cost to run.



Warm air heated houses get economical heating from the G-E Winter Air Conditioner (Oil or Gas). It also provides winter air conditioning at no extra cost — humidifying, filtering and circulating warmed air.

PUBLISHER'S PAGE

War, Business, Building

AS THIS issue of *American Builder* goes to press the question of war in Europe hangs in the balance. It may be settled affirmatively, or still be hanging in the balance, when this reaches you. Polls show a large majority of the American people (1) oppose our entering any war over there but (2) believe that if one occurs we will be dragged in.

In case of war what will be the effect on business, and especially building, in the United States? The Great War lasted almost three years—August, 1914, to April, 1917—before we entered it. Business in this country declined during its first year; but both business in general and building in particular greatly increased during its second and third years.

Conditions changed rapidly after we became involved. Our government needed all the labor and products it could get. Therefore, while business as a whole continued to expand, the government imposed restrictions that caused a sharp decline of building from which it did not recover until after the post-war slump in 1921-1922. And belated effects of the war helped cause the depression beginning in 1929. One thing seems certain from all experience: for this country to enter a war will be bad for our business in general and building in particular.

BUT suppose there is a war and we do not engage in it? *Experience* indicates that for a few months it will hurt our business; that later it will cause a "boom" here that will last as long as increased purchases of our products by the warring nations continue; and that this "boom" will collapse and be followed by depression after war ends.

But how much is experience *worth now* in forecasting business here in case of war? Never before at the beginning of any modern war did world economic conditions, or economic conditions in the United States, resemble those existing now. International trade is still disrupted by the effects of the last war and by *currency* and other economic policies since followed by most great nations. The warring nations would desire, as before, to buy more from us; but what would they buy with? They could not pay us in their money, because it would be paper worthless to us; they could not trade us more of their products because they would need all they could produce for war purposes; and we would hardly sell them vast quantities of our products on credit in view of their failure to pay the debts to us that they incurred in the last war.

However, foreigners do own American property and securities of a present value of 5 billion dollars or more with which they could increase their buying from us. Therefore, a war in which we did not engage probably would soon stimulate our business some, but nowhere near as much as the last one.

THE effects on our business in this country, and especially on building, of a war that we entered would be wholly bad. The so-called "profits" made during the last war were mostly fictitious and were subsequently lost. Furthermore, if we entered another war government probably would assume a dictatorship that would make profitable operation of business impossible and restoration of free government and private enterprise extremely difficult or impossible.

Every kind of American business, especially the building business—every American citizen—has and will have the strongest possible reason for working to keep the United States out of war and for condemning and resisting all propaganda to lead or drive us in.

Samuel O. Dunn

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CORBETTA CONSTRUCTION CO., concrete contractors for Queens Bridge Housing Development, Long Island City, New York, saved a nice piece of change by using 'Incor' 24-Hour Cement.

Erected for New York City Housing Authority, this huge $15-million USHA-financed project consists of 96 six-story units—brick masonry with concrete floors. It took 5 days to bring masonry up to floor levels, so in this instance there was no economy in using 'Incor' throughout.

But alert Corbetta Construction Co., experienced in using 'Incor' on other jobs, saw a chance to effect a saving: They formed one complete set of floors for 36 of the 96 units; then used 'Incor' for the roofs, in order to re-use forms without loss of time. Forms were stripped in 24 hours and immediately re-used. 'Incor' saved 7 working days.

Overhead was $500 a day, so the 7-day 'Incor' saving meant $3500. Extra cost of 'Incor', $1258. *Net saving, $2242—or $1.79 on each of 1254 cu. yd. of 'Incor' concrete. Nice money, that!*

Further proof that it pays to use 'Incor' wherever dependable 24-hour service strength shows a net saving; elsewhere, use Lone Star—quality standard ever since 1900. Write for copy of "Cutting Concrete Costs." Lone Star Cement Corporation, Room 2231, 342 Madison Avenue, New York. *Reg. U. S. Pat. Off.

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MAKERS OF LONE STAR CEMENT • • • 'INCOR' 24-HOUR CEMENT

AMERICAN BUILDER
AND BUILDING AGE

4½ Per Cent Building Money

ON AUGUST 1, Federal Housing Administrator Stewart McDonald issued a new Regulation reducing the maximum interest rate on home mortgages eligible for FHA approval and insurance to 4½ per cent. The former maximum rate was 5 per cent. So, this is a reduction in the cost of mortgage money of 10 per cent.

The effect of this substantial saving to home builders and home buyers should prove a real impetus to construction. It will be particularly helpful in the field of low cost homes, since it will make still more valid the proposition that "rent money will buy a home."

For homes that are bought on long-term mortgages—and most of them are—a saving in the interest rate means more to the buyer than lowered building material prices or decreased costs of building labor. Whereas a 20 per cent reduction in material costs would mean a saving of only 9.33 per cent in monthly home purchase payments, and a 20 per cent reduction in labor costs would save the purchaser only 4.67 per cent on the total, a reduction of 20 per cent in interest rate reduces the monthly home buying expense 16.69 per cent. The above figures were furnished by Robert Davison, Director of Housing Research for the Pierce Foundation, in his recent testimony before the T.N.E.C. hearing in Washington. Using Mr. Davison's figures, this latest reduction in FHA maximum interest from 5 per cent to 4½ per cent will mean that *the home buyer's monthly payments will be reduced 8.35 per cent.*

Definite examples of what this lowered interest rate advantage means to small home builders and buyers have been furnished us by the Robert Herndon Company, real estate operators in Detroit. A workingman wanting to buy a house with his saving of, say, $230 a year, continuing for 25 years, will find that if the interest rate is high he can get only a small house; but if a low rate is in effect, he will be able to get a larger house for the same yearly outlay. His $230 annual payment will acquire a home about as follows: at 6 per cent he can pay in 25 years for a $2,940 house; at 5 per cent, one costing $3,240; and at 4½ per cent a $3,500 house for the same yearly outlay.

As the rate of interest is lowered the size and value of the house he can build for exactly the same yearly cost increases. One can readily see that at 6 per cent the class of house a buyer can get will have a value of less than $3,000; and this may not be sufficiently inviting. But as the rate of interest falls, he finds he can buy a bigger and better house for the same monthly outlay and so is more likely to decide to build instead of continuing to pay rent.

Furthermore, because of the lowered interest rate the market for the $3,000 dwelling is broadened, the necessary monthly payments coming down within reach of many more families. For a $3,000 dwelling it is estimated that the yearly payments would be: at 6 per cent, $235; at 5 per cent, $213; and at 4½ per cent, $197.

Under this new rate, payments of approximately 20 cents a day for each $1,000 of total cost will pay for a new built-to-order home.

While this change will cause some heartburning among mortgage loaning institutions they will quickly adjust themselves to this new condition. All interest rates are low and this downward move for home mortgages merely reflects the general money market. The basic soundness of small owner-occupied homes as security is well established. There will be plenty of money available for all home building. Building industry men will be quick to take advantage of the substantial saving in home purchase costs which this new interest rate gives them. Truly now as never before the building industry is delivering "more house for the money."

THIS cartoon on the editorial page of the Seattle Post-Intelligencer of Aug. 7 shows the popular response to this lowered interest rate.

"Systematized Production" Cuts Costs at Orchard Park

New Jersey Builder Prefers Day Labor to Subcontracts. Uses Power Saw, End-Matched Sheathing, 12 Per Cent Moisture Content Lumber. Features Winter Air Conditioning

"QUAKER WAY" HOUSE with rail fence sets high standard of Colonial charm. The 28 by 21 ft. floor plan is similar to design on page 52.

IT is one thing to cut costs by sacrificing quality. But it takes brains, business acumen and building skill to cut costs and at the same time *improve* quality.

That is what Wilbur Dunham, president of Orchard Park, set out to do less than a year ago when he opened his new 157-house development at Union, N. J. As far as quality of materials and workmanship go, nothing better is done in houses costing $40,000 and up. Yet Dunham's price range is $6,000 to $9,000.

His quality materials include such products as Weyerhaeuser kiln-dried 4-Square lumber, Morgan millwork and cabinets, clear white oak flooring, Chase brass pipe and flashing, Andersen factory-built windows, Dutch Boy white lead, Electrolux refrigerators and Fox Furnace Co. Sunbeam winter air conditioning systems.

Top-notch quality is revealed in the heating plant, which is scientifically laid out by engineers of the William A. Scherff heating organization of Union City, N. J., and N. Y., who is the regional representative of Fox Furnace Company. The system provides filtered, humidified air warmed and evenly distributed to all parts of the house.

Wilbur Dunham has devoted a lifetime to the building field, and Orchard Park is the culmination of many years of study and experience. Dunham believes that home building must be better organized, that tested production line methods of other industries and more efficient mass buying must be practiced. He has checked and rechecked all the operations involved in planning, purchasing and erecting homes and has developed some very definite ideas about the kind of organization needed to provide a better house for the money at lower cost.

Favors Day Labor

One of these is the use of day labor employed by the contractor himself rather than the subletting of work. All the operations at Orchard Park except plumbing and wiring are done by day labor—employees working for Dunham himself. Accurate cost records show a definite saving, he declares. For example, a drop of 26 per cent in the cost of labor on mason work resulted from the change from subcontract to day labor basis. Dunham now uses only two skilled masons who are paid $1 an hour. They have, however, three helpers at 50 cents an hour, who hand up the blocks, mix the mortar, put in the footings and do all the odd jobs. The skilled masons are not permitted any waste motion. The helpers keep them busy and the resulting production is high.

The same system is applied to other trades. Dunham has organized small specialized crews trained to do one or two things fast and well. A 20 per cent saving in carpentry cost was achieved by this system. A typical carpentry crew consists of one expert "key" man earning 85 cents an hour, who has under him a carpenter at 75 cents and two apprentice helpers earning from $4 to $5 a day.

One man has been trained in the use of an electric power saw. The lumber for a whole house is delivered in one large transport truck. The power saw operator cuts everything that goes into the house, and as he does so a helper takes it and piles it on each of the four sides

Curved Streets and Driveways, Attractive Curbing, Grass, Shrubbery and Good Architecture Create a Homelike Community. Price Range Is from $6,000 to $9,000

EACH ORCHARD PARK HOME is specially designed for its site by McMurray and Schmidlin, Union, N. J., architects. This wide, low-roof Colonial has a commanding corner position.

of the site where it will be used. The entire cutting job takes approximately eight hours.

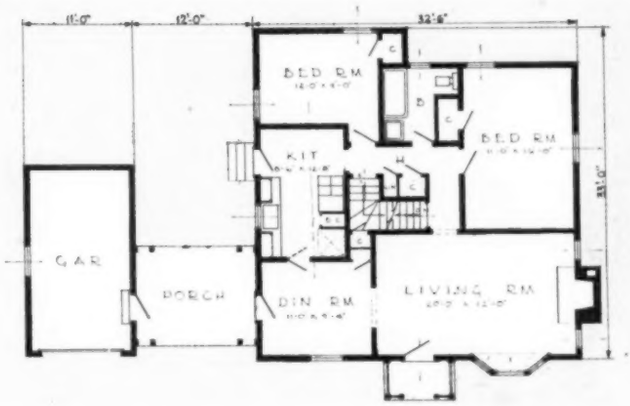
The following day specialized framers and sheathers go on the job. Sheathing the average Orchard Park house takes about six hours for two men, using Weyerhaeuser kiln-dried, end-matched sheathing laid diagonally. In addition to providing an exceptionally weathertight job, this type of sheathing, Dunham points out, lays up much faster than others and has practically no waste.

Dunham applies the day labor basis to as many operations as possible. Duct work, for example, is fabricated in a small shop on the job. Painters work in specialized crews on a day basis. The men so employed earn better wages than they can get anywhere else because they are regularly employed and can count on a steady job. In less than a year Dunham has sold more than 50 houses and expects to finish the 157-home development before the end of a second year.

Use of as much prefabricated or factory-built material as possible is another theory of Wilbur Dunham's which he has thoroughly tried out. Window frames, for example, are delivered to the job complete except for inside trim. These are toxic-treated, water and termite proof Andersen ready-assembled frames, delivered to the job complete with weatherstrip, Unique sash balance installed, glass installed, ready for setting in place.

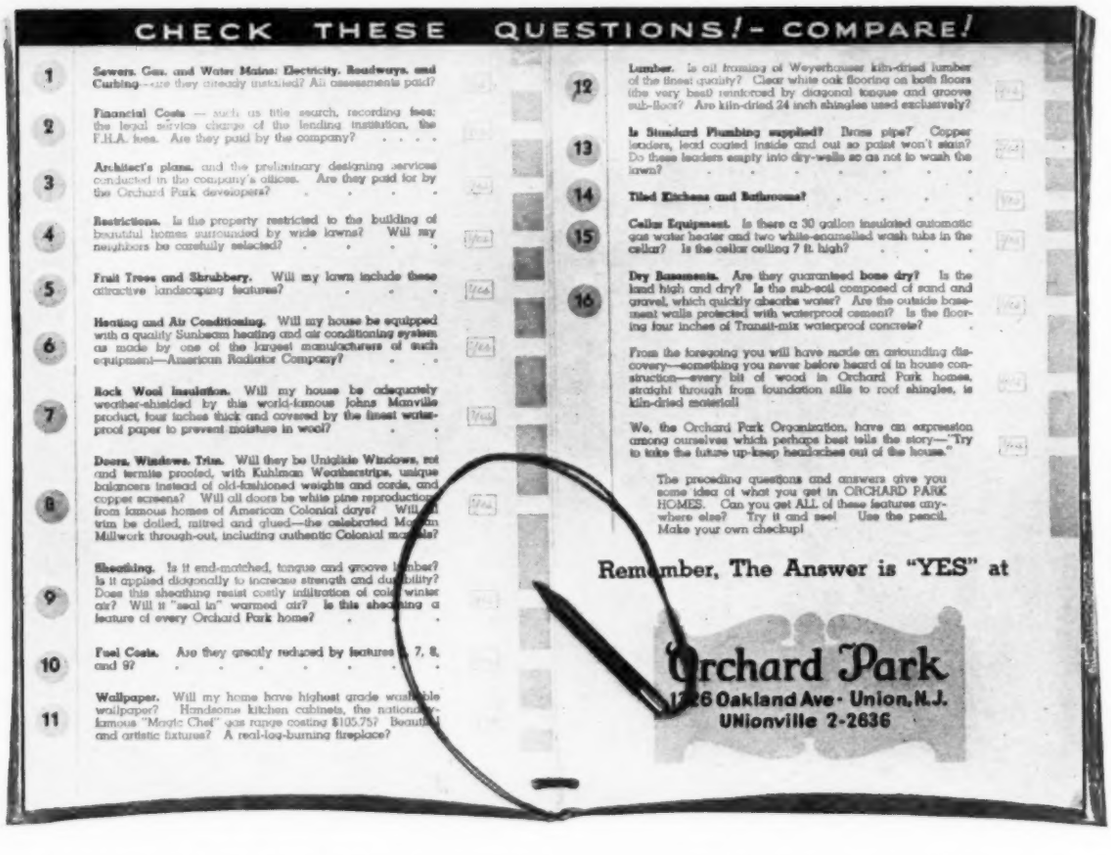
Expert Architectural Service

A considerable degree of standardization of construction methods is made possible by the use of one or two basic plans in which the major construction operations are standardized. The "basic house" is a rectangular, simple structure with a floor plan 28 by 21 feet. This permits 6



COVERED PORCH and attached garage give an impressive length to this design. There are 2 bedrooms downstairs, and space for more upstairs.

KILN-DRIED PACKAGED LUMBER and endless sheathing are used. Note care with which packaged lumber and frames were covered with tarpaulin. (Tarpaulin was in this case temporarily turned back for photographing.)



Sales Folder Check List

PROSPECTS are handed this 6 x 9 heavy cardboard folder with pencil attached, and told to check off the advantages of Orchard Park over any other places they may visit. Most prospects visit a number of developments before making a final decision.

well-proportioned, well-lighted and ventilated rooms and bath. There is usually a porch or terrace and an attached garage. Typical designs are shown with plans on the nine pages beginning with the one opposite; Orchard Park heating layouts appear on pages 47 and 54.

McMurray and Schmidlin, architects of Union, N. J., do all the planning, and much credit for the beauty of Orchard Park must be given not only to the attractive fashion in which the houses are designed in the first place, but to the manner in which they are placed on the property, with winding roads, curved driveways and pleasing vistas. The houses have unusual architectural charm, and while there has been some standardization of floor plan, the exteriors have been given a colorful and interesting variation in treatment.

Practically no houses at Orchard Park are built on speculation. The customer selects the site and is quoted a price on the basic house. This price provides a sound and satisfactory house but does not include many of the extras that increase cost. If, for example, the base price on a particular house is $6,500, it will then be

(Continued to page 94)

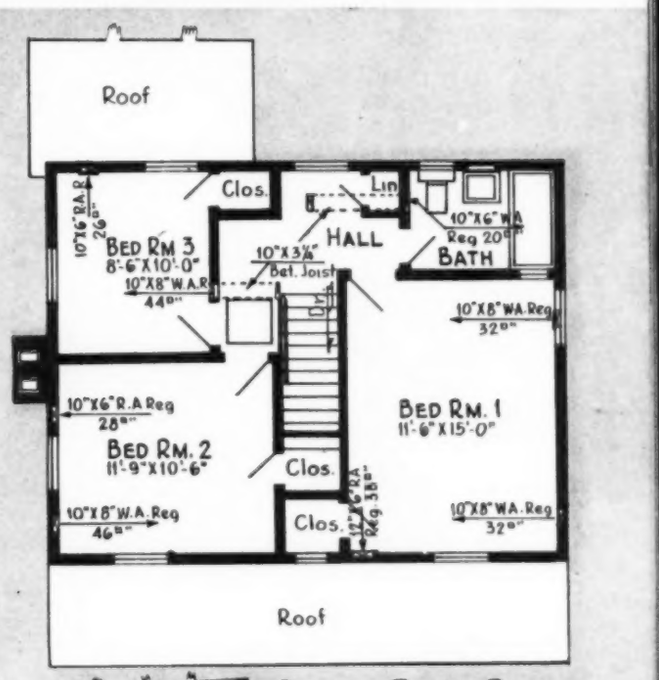
End Matched Sheathing

KILN-DRIED, end matched sheathing laid diagonally is used throughout the Orchard Park houses, providing a tight, windproof wall. Two men apply sheathing for the average house in 6 hours time.

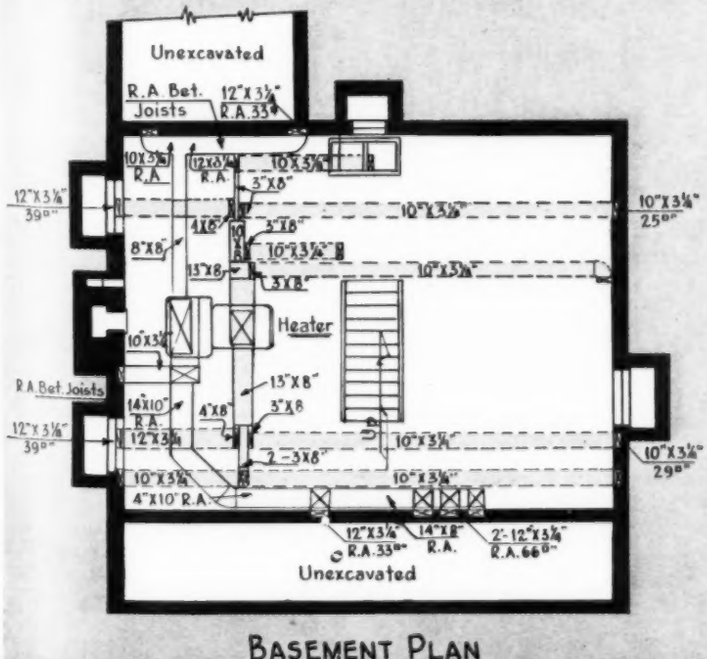
WHITE PILLARED COLONIAL WITH COMPACT BASIC PLAN

FLOOR PLAN of this imposing little Orchard Park home is a basic plan only 28 by 22 ft., which is widely used but with numerous exterior variations. In above design a 2-story porch with white pillars has given it an imposing front. The corner lot makes possible the covered porch and terrace leading to the 2-car garage. It was designed by Architects McMurray and Schmidlin; see pages 48 to 55 for more of their designs.

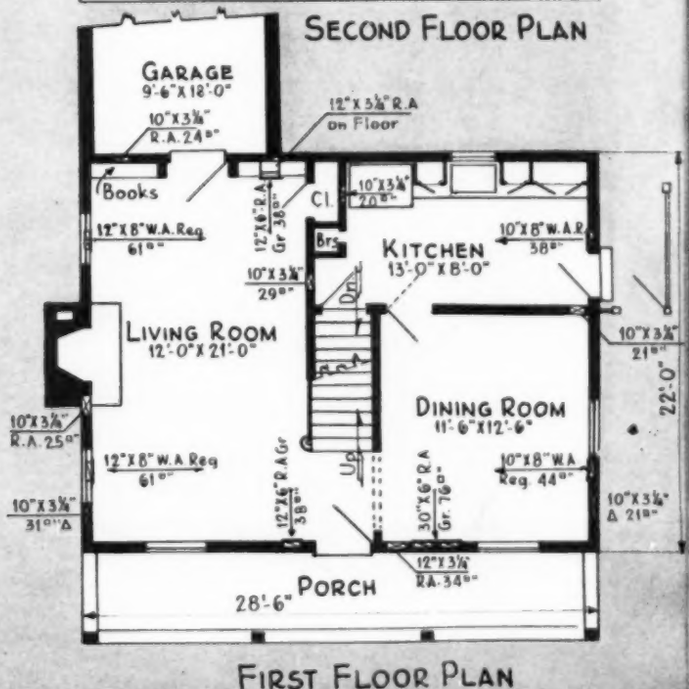
AMERICAN BUILDER
Tru-Cost FIGURES
FOR THESE HOUSES
ON PAGE
65



SECOND FLOOR PLAN



BASEMENT PLAN

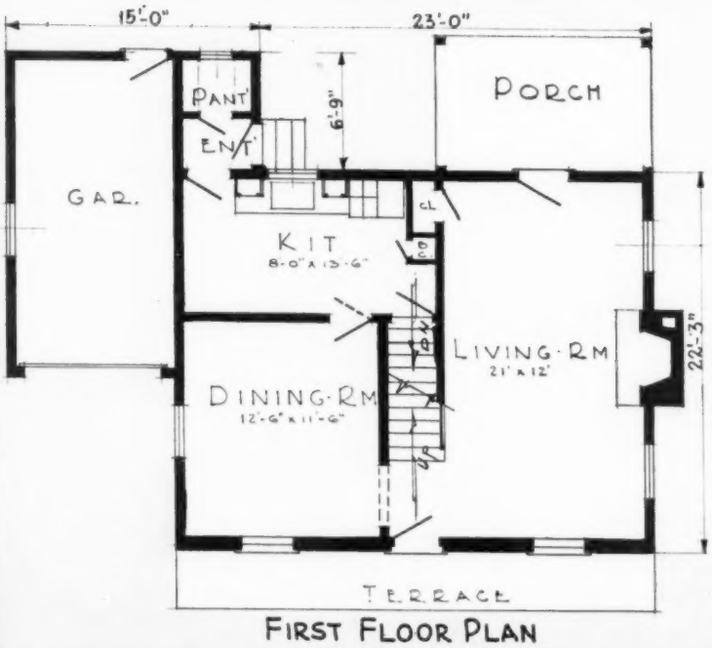


FIRST FLOOR PLAN

48 THE 12 BY 21 FT. LIVING ROOM has a nicely detailed Colonial mantel flanked by vertical pine paneling painted white.

BUILT-IN BOOKSHELVES at left add to the study of Monterey home. KITCHEN is equipped with gas range and refrigerator, factory-built cabinets, tiled walls.

THIS BASIC ORCHARD PARK FLOOR PLAN is used with numerous variations throughout the development. Rooms are well proportioned, well laid out. Same plan is used for houses on opposite page, yet appearance is very different.



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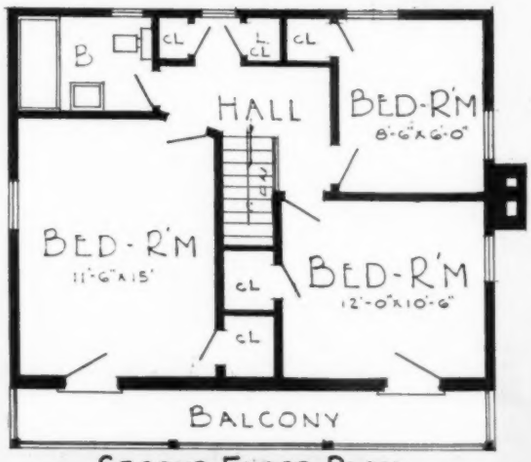


SECOND FLOOR PLAN

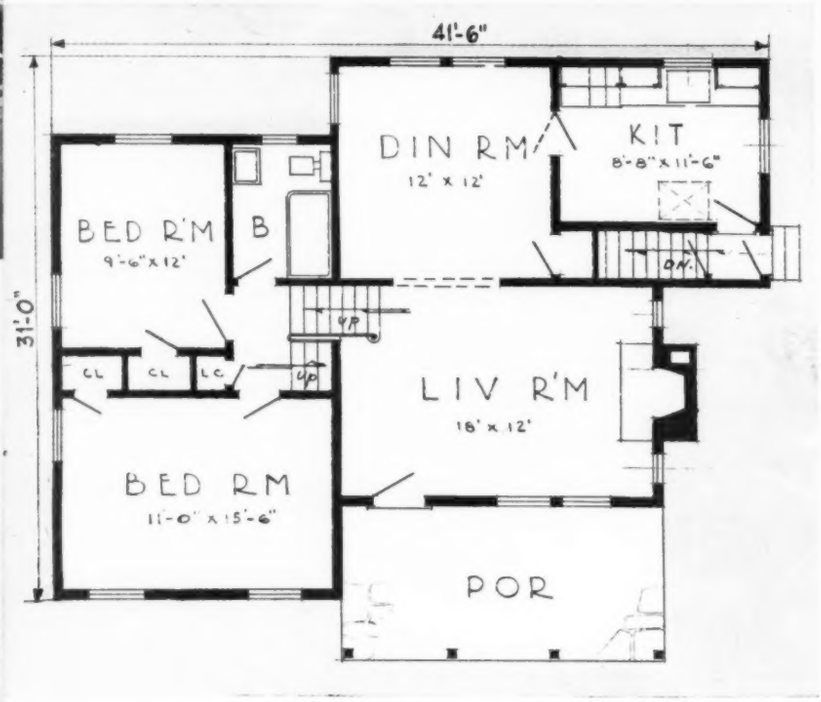
28′ x 22′-3″ ORCHARD PARK COLONIALS

McMurray and Schmidlin, Architects, Union, N. J.

THE SAME PLAN, shown on opposite page, was used for both of these houses, yet how different the exterior! The balconied Colonial at right has been much admired. The standard Colonial below, with brick and siding exterior, is consistently popular.

ORCHARD PARK homes are built with quality materials throughout and are equipped with gas-fired winter air conditioning systems. The houses have a 21 by 12 ft. living room, ample kitchen and dining room, attached garage, 3 bedrooms and bath, providing an exceptionally attractive and livable house on a basic floor plan only 28 by 22¼ ft.

THE COVERED PORCH and the easily accessible garage with large overhead door are important features of this 3-level Orchard Park home.



TWO VARIATIONS of the same economical plan are shown above—both very popular in Wilbur Dunham's Orchard Park development at Union, N. J. House at top of page has fine front porch, while lower design has an attractive porch and broad terrace opening off the dining room at rear.

SPACE SAVING, 3-LEVEL DESIGN—35′ x 41½′

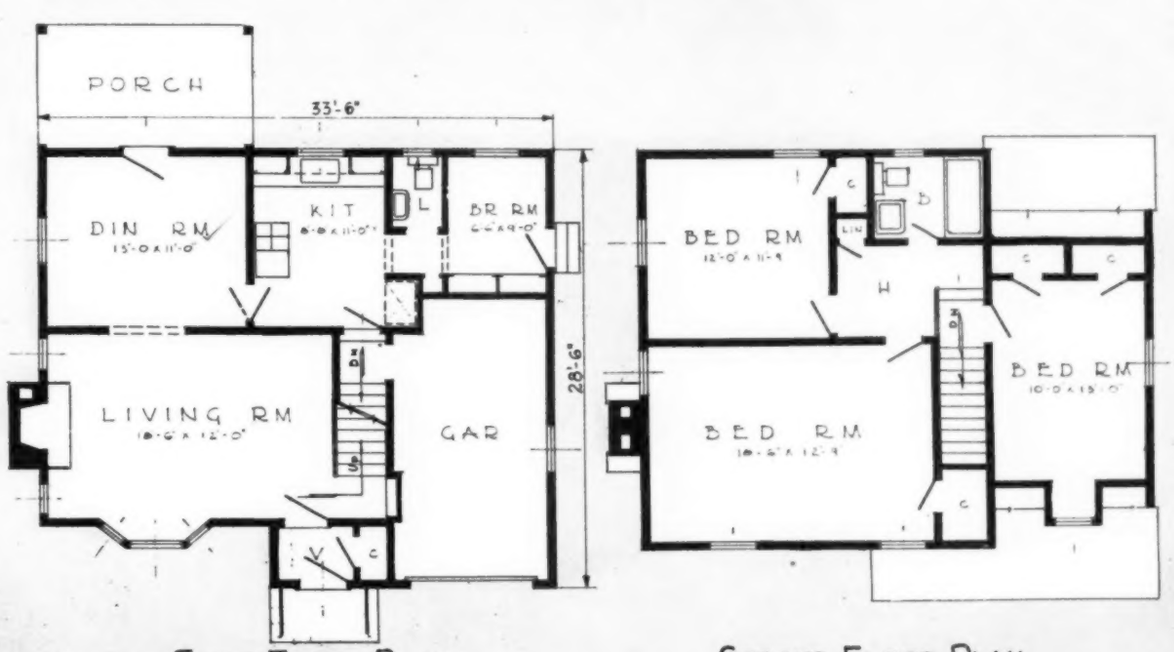
THERE ARE 3 LEVELS in this house: the 2 bedrooms and bath are located 8 steps up above the living room level over the garage. Four additional steps lead to another bedroom, not shown on plan. It is an economical type of house to build. The 2 exteriors above have approximately the same plan. The house is air conditioned, insulated, well planned and well built. The architects are McMurray and Schmidlin of Union, N. J.

Photos by Geo. E. Chapman

BROAD GABLE—FINE BAY WINDOW—AIR CONDITIONED

ONE OF THE LARGER Orchard Park homes, located at Union, N. J., and designed by McMurray and Schmidlin. The floor plan is unusually good, with a spacious living room and well proportioned dining room which has a porch at rear. There are a lavatory and breakfast room off the kitchen, and an attached garage with inside entrance. Upstairs there are 3 good-sized rooms and bath, with ample closets, no waste space. The heating system consists of a gas-fired winter air conditioning system which has proved economical both to install and operate. The house is framed with kiln-dried, 4-Square lumber, end-matched sheathing. An unusual effect is obtained in the gable front by the use of irregular siding painted white.

AMERICAN BUILDER
TruCost FIGURES
FOR THESE HOUSES
ON PAGE
65

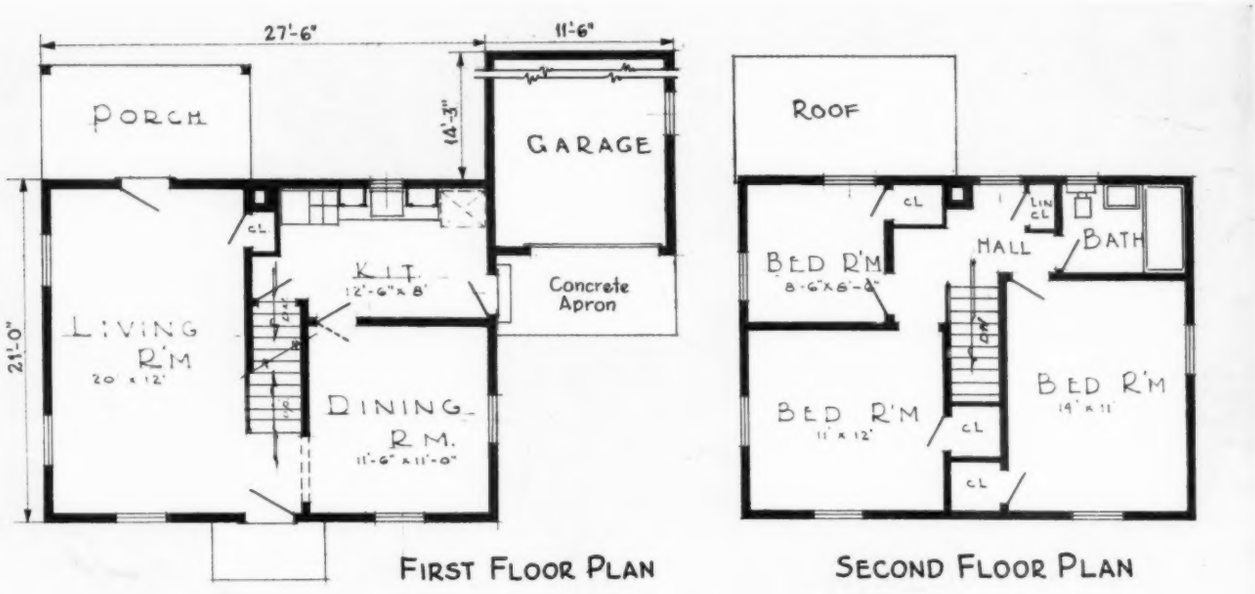


FIRST FLOOR PLAN

SECOND FLOOR PLAN

MAXIMUM LIVING SPACE IN 28′ X 21′ PLAN

SIMPLE RECTANGULAR PLAN of this little Georgian design at Orchard Park, Union, N. J., provides a maximum amount of living space for the cubage enclosed. With an exterior dimension of 28′ x 21′, Architects McMurray and Schmidlin are able to provide a 20′ x 12′ living room, 11½′ x 11′ dining room, a 12′6″ x 8′ kitchen, plus 3 good bedrooms and bath upstairs. The attached garage has been set well back so as not to interfere with light in either the dining room or kitchen. Also the concrete front apron of the garage serves as a back porch for the rear door. Treatment of the architectural details is good, especially the vertical boarding which runs across front of house between second floor windows. Shutter designs are different, and the wrought-iron front porch railing is attractive.

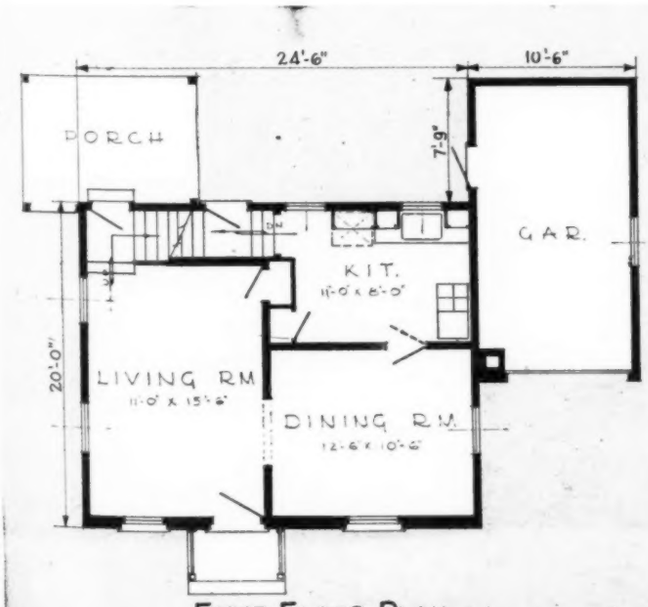


FIRST FLOOR PLAN — SECOND FLOOR PLAN

POPULAR 28′ x 21′ floor plan used with various exterior changes throughout the Orchard Park development at Union, N. J.

STONE FRONT—5 ROOMS—25 X 20 FT. PLAN

THIS VERY ATTRACTIVE but compact little stone front house in Orchard Park at Union, N. J., has only 2 bedrooms, but a lot of house has been compressed into the 25' x 20' plan. The living room is 11' x 15½', with exposure on 3 sides and a door leading to open porch at rear. The kitchen is large, with extensive equipment and tile walls. House is air conditioned, insulated and built throughout with quality materials. It was designed by Architects McMurray and Schmidlin of Union, N. J. Specifications include Weyerhauser 4-Square lumber, end-matched sheathing, Dutch Boy white lead and oil paint, Sargent Colonial hardware, Morgan Colonial trim, doors and mantel, Andersen frames, Chase brass, National Gypsum "floating wall" construction.



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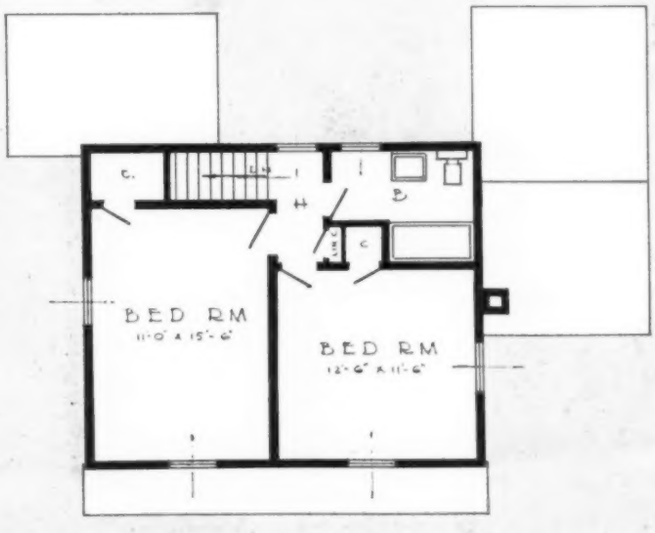

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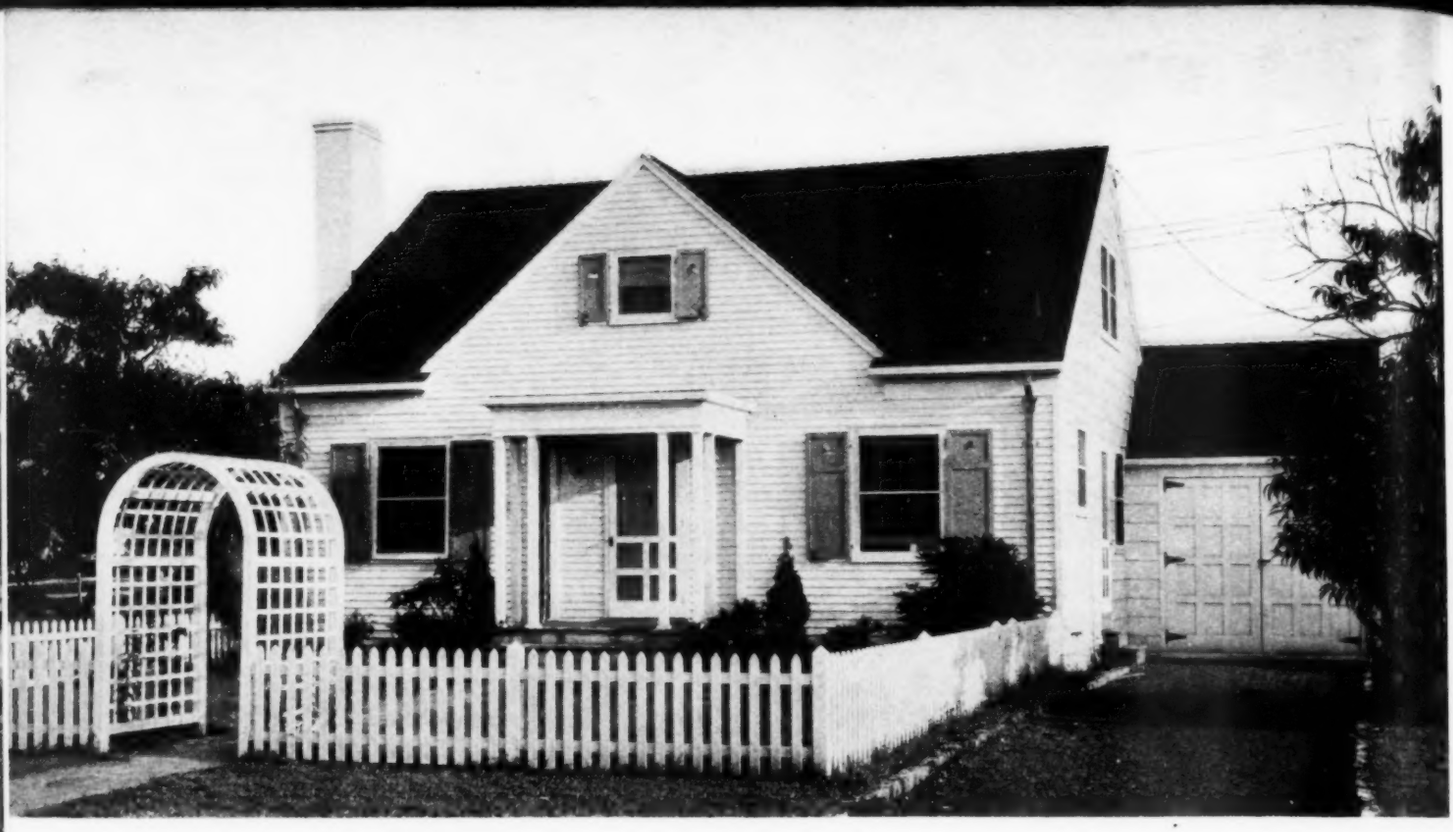
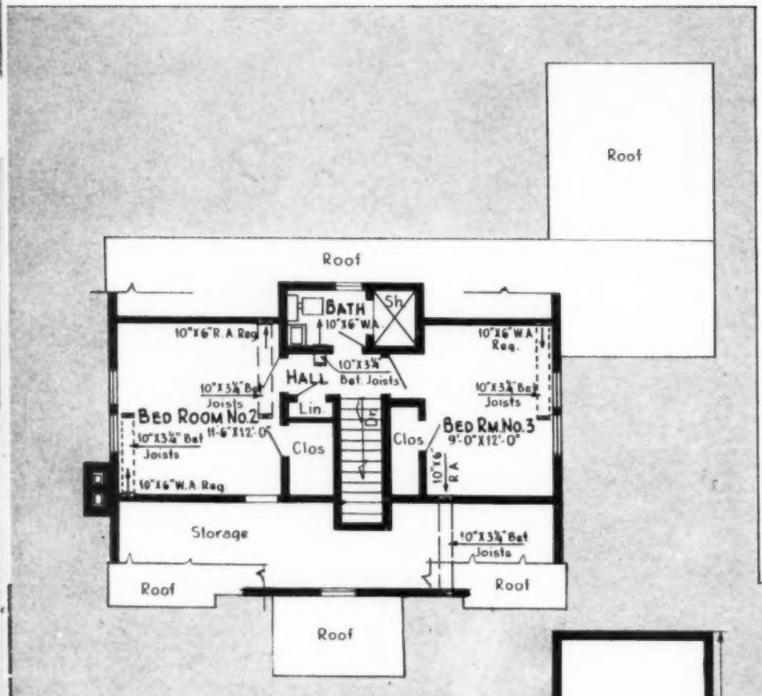


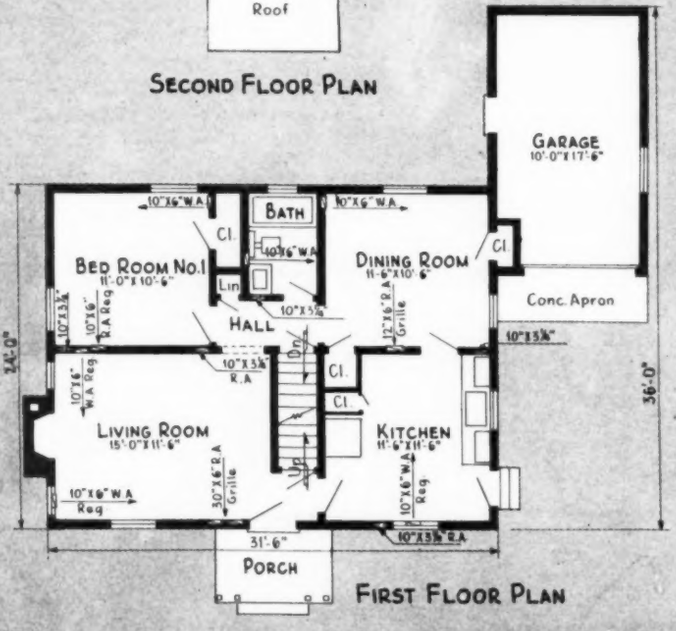
1st FLOOR BEDROOM, BATH

Wilbur Dunham, Builder
McMurray and Schmidlin, Architects

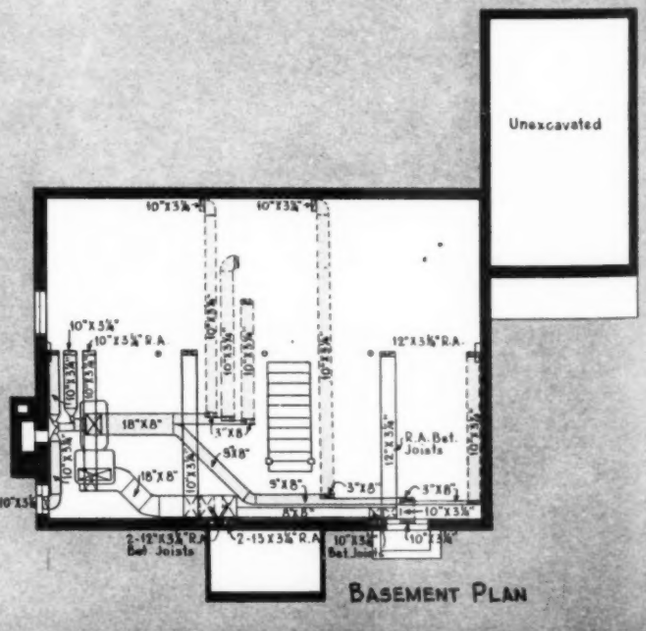
THE DOWNSTAIRS BEDROOM and bath have proved to be an important feature of this well-designed Orchard Park Colonial with attractive picket fence and entrance trellis. There are two bedrooms and a bath upstairs, with large windows and closets. Kitchen has been placed at front, and dining room at rear away from street. Some families might prefer to make the dining room do double duty as bedroom or study. The kitchen is unusually large, with ample space for a small dining table. The house was designed by McMurray and Schmidlin of Union, N. J.



SECOND FLOOR PLAN



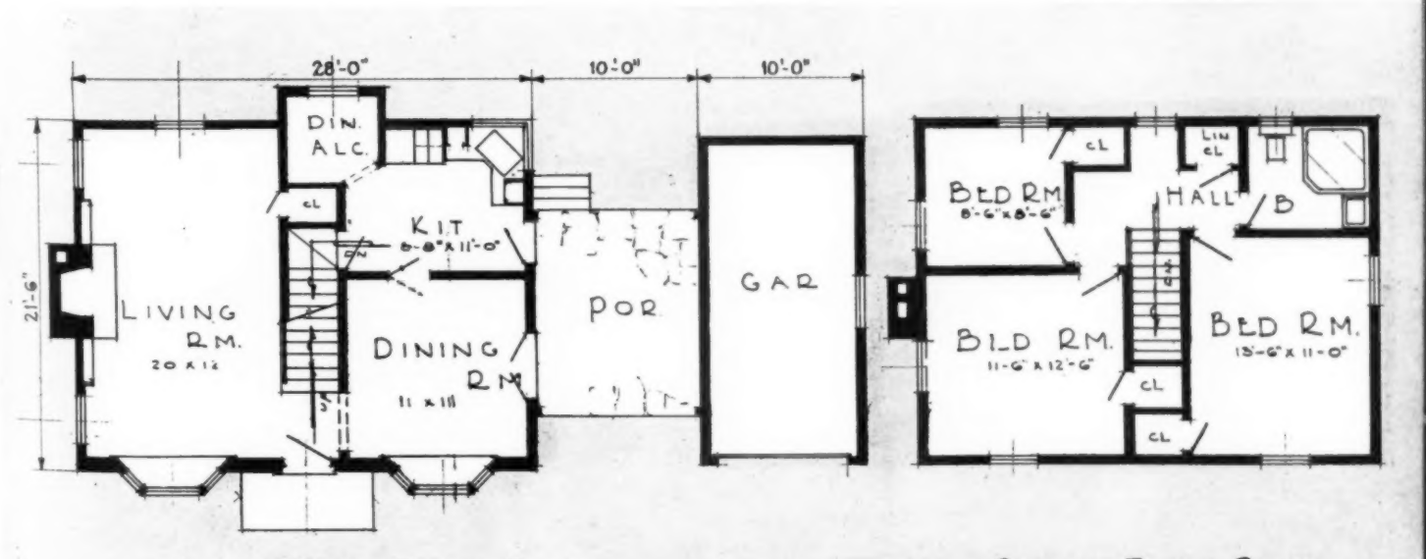
FIRST FLOOR PLAN



BASEMENT PLAN

WINDING ROADS—ATTRACTIVE DRIVES AND CURBS

A SUCCESSFUL DEVELOPMENT depends on a good deal more than good design, which the above house undoubtedly has. In Wilbur Dunham's development at Orchard Park, Union, N. J., the roads are attractively curved to fit the landscape and the houses placed with due regard for setting. Curbing is of Belgian paving brick, with the large size units stood on end. Driveways are long-lasting penetration macadam. Price of the house includes complete landscaping with a good grass lawn and attractive shrubbery. Standard 28′ x 21′ Orchard Park layout similar to one on pages 47 and 52 is used with addition of a dining alcove and an attractive garage with covered porch. The large bay windows add much to the living and dining rooms. Architects are McMurray and Schmidlin of Union, N. J.

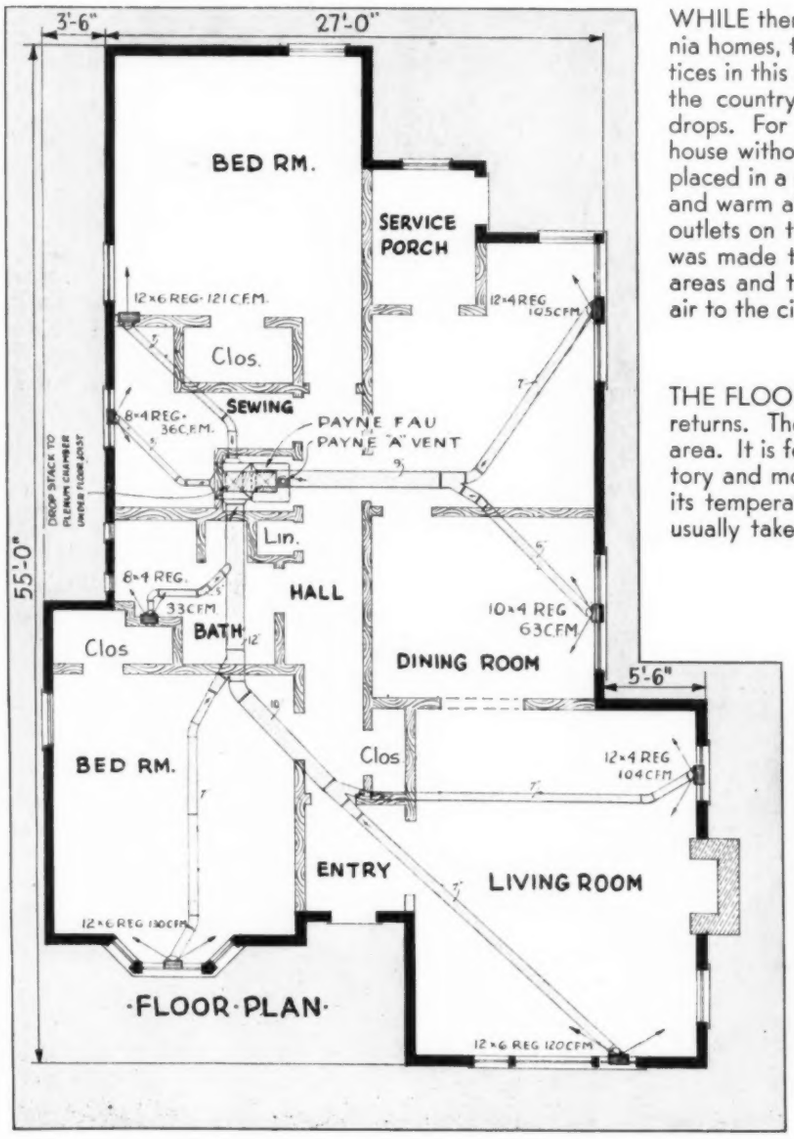


FIRST FLOOR PLAN

SECOND FLOOR PLAN

THIS typical California modern small home located in Los Angeles was designed by W. J. Varner and H. J. Mann, architects, and built by Noland Morris.

5-ROOM CALIFORNIA HOUSE, WINTER CONDITIONED



WHILE there is a very definite need for heating in California homes, the temperate climate has allowed certain practices in this state which cannot be applied to other parts of the country where there are more extreme temperature drops. For instance, in this typical five-room Los Angeles house without basement, the winter air conditioning unit is placed in a small, centrally located heater room off the hall, and warm air ducts are run beneath the floor to baseboard outlets on the outside walls of each room. This placement was made to cut operation cost by warming the exposed areas and transmitting warmth rather than infiltrated cold air to the circulating air within the rooms.

THE FLOOR PLAN at the left does not show any cold air returns. These are not recommended in the Los Angeles area. It is found that the use of outside air is more satisfactory and more healthful, since it is a simple matter to raise its temperature to an inside comfort level. Outside air is usually taken in through wall louvers or from under house.

THE Payne forced air unit shown at the left was installed in this Los Angeles house. It is equipped with glass wool replacement filters and compact enough to go in small closet.

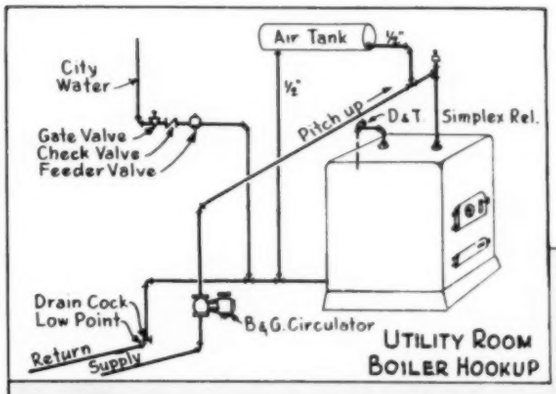
AMERICAN BUILDER True Cost FIGURES FOR THESE HOUSES ON PAGE 65

BASEMENTLESS CHICAGO HOME—HOT WATER HEAT

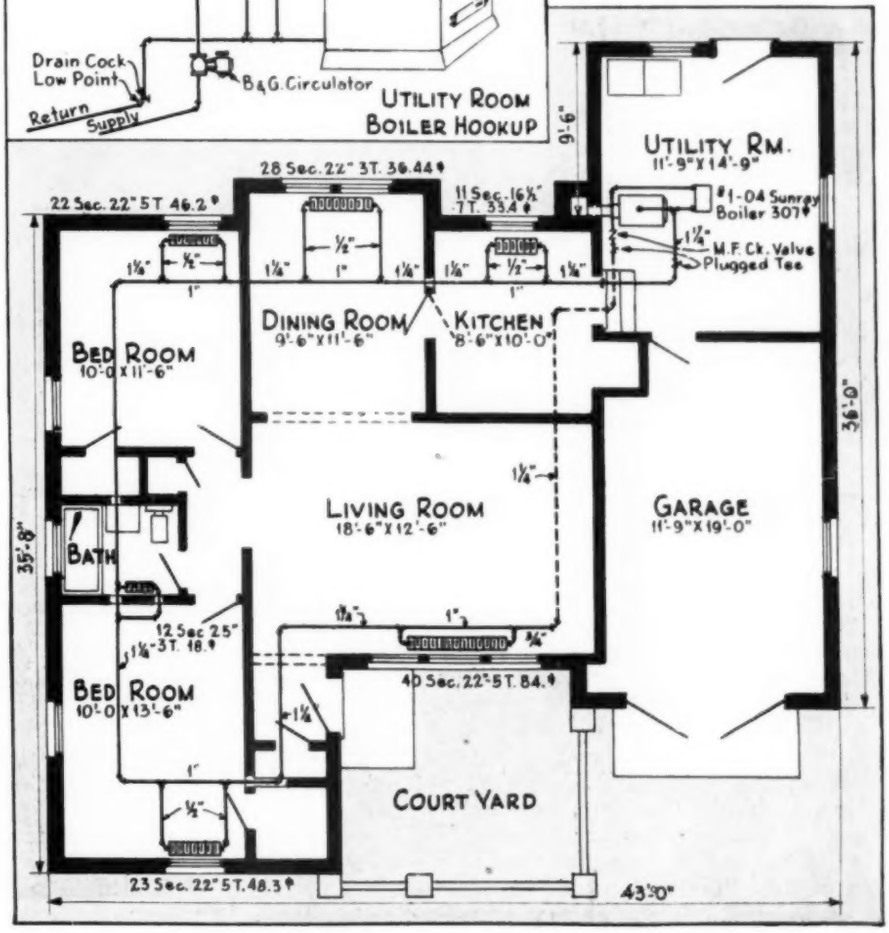
IN Fred J. Walsh's Lincolnwood development, suburban Chicago, an increasing number of attractive moderate size homes are being built. The English cottage above on this page is typical of the general styling; an innovation is the use of forced hot water heat with boiler located in a utility room, the house being without basement. The system consists of a U. S. Radiator Sunray boiler, oil-fired, U. S. "Slenderized" radiators, Bell & Gossett circulator, and a one-pipe system of forced-flow design developed by General Heating Corp., Chicago. The novel piping and boiler hook-up is shown on plan at right.

Fred J. Walsh,
Chicago, Builder

IN this five-room house with attached garage and utility room wing, Martin H. Braun, architect for Fred J. Walsh, has combined an attractive English exterior with an economical floor plan. The exterior is common clinker brick, limestone, and pine vertical boards and battens stained dark; roof is USG 3-in-1 210 lb. asphalt shingles. USG Weatherboard sheathing, Hines kiln-dried preshrunk No. 1 framing lumber, USG Metallated Rocklath under 3-coat plaster, rock wool fill in eaves, Armco gutters and flashing, G-E all-metal kitchen cases, Rittenhouse door chimes are some other materials and equipment used.



THE construction view above does not show the completed court yard, as detailed in the plan below. The wide arch between living room and dining room gives a spacious feeling to the interior; bedrooms are well placed in relation to other rooms.



ABOVE: Front view of home located in Country Club Gardens, Birmingham, Ala., designed in a modified Cape Cod style to fit southern conditions, and built by J. B. Privett.

LEFT: Rear view of this home shows the two wings flanking screened-in loggia and passageway.

AMERICAN BUILDER True Cost FIGURES FOR THIS HOUSE ON PAGE 65

J. B. Privett, Builder, Birmingham, Ala.

GAS HEATED AND ATTIC FAN COOLED ALABAMA HOME

THIS attractive rambling Colonial house of eight rooms was built and sold by J. B. Privett, Birmingham, Ala. Its spread-out floor plan, not evident from the street, takes full advantage of the southern climate, with provision for cross ventilation and outdoor living.

It has a brick foundation, red cedar shingles over wood framing on sidewalls, and blue-black asphalt roof; garage is concrete block. There are three baths, including one for the maid's room in the garage wing. The automatic heating system and provision for comfort cooling add greatly to the livability.

For winter, a Bryant automatic gas-fired system located in the heater room between kitchen and dining room provides conditioning. In the floor plan opposite, it will be noticed that all duct work is laid out to run under the floor, since it is reported that there has been some trouble around Birmingham with the placement of warm air supply above the ceiling; cool floors are apt to result. The method of connecting both supply and return ducts is also shown on floor plan.

For summer cooling, a Buffalo attic fan, 42-inch size, is connected to an exhaust grille in the hall ceiling. A tunnel built of Celotex board runs from the fan to the discharge louvers. Fresh air comes in the windows.

THE VIEW ABOVE shows the side entrances in the wing terminated by the two-car garage of this rambling Colonial in Birmingham, Ala.

THE FLOOR PLAN at the left and below indicates the arrangement of the rear of this house, as seen in the lower view on the opposite page.

THE UNUSUAL HEATING SYSTEM of this house built by J. B. Privett is laid out on the floor plan above. In the lower left corner, the method of connecting the cold and warm air ducts to the gas-fired conditioner and running under the floor is shown.

W. G. HUGGINS designed and built this fine demonstration home in Wilmette, Ill.; Hoffman Bros., co-operating lumber dealer.

MODERN HEATING PLANT IN EARLY AMERICAN DESIGN

THIS Early American home, built in Indian Hill Estates, Wilmette, Ill., by the W. C. Huggins Home Engineering Company, is now on demonstration and exhibits most of the fine features which can be built into a medium priced home today. The exterior is very well handled, as to design, craftsmanship and choice of materials; the floor plans on the third page following indicate the careful planning of this eight-room house and attached garage having servants' or guests quarters above and a separate heating plant.

Starting with the basement, which contains a large finished recreation room and wood-burning fireplace to the front, with a carefully engineered winter air conditioning system, laundry equipment and home shop to the rear, and going clear through to the suite of rooms above the garage, one finds that all details have been carefully considered from the standpoint of livability and convenience.

W. C. Huggins Home Engineering Company, Wilmette, Ill., Designers, Builders

AMERICAN BUILDER TruCost FIGURES FOR THIS HOUSE ON PAGE 65

THE modern kitchen of this demonstration home located in a Chicago North Shore suburb is a gem of compactness and, at the same time, combines all the modern equipment features in demand today. Highlights are the double compartment dishwashing sink, plate glass closures on butler pantry shelves, stainless metal trim, Vitrolite walls, kitchen ventilating fan with duct built into cabinets.

SEE TWO PAGES FOLLOWING FOR BASEMENT DETAILS AND FLOOR PLANS WITH HEATING LAYOUT

STAIR hall with living room and study seen beyond. Mantel has built-in niche lighting.

The house is placed lengthwise on the lot, with the front door access from the drive. The large bay window of the living room overlooks the estate properties to the front, and the L-shaped screened porch connecting house and garage is a secluded spot for outdoor living at the rear. A deck above enclosed with railing connects the second floor of house and garage.

SPECIFICATION OUTLINE

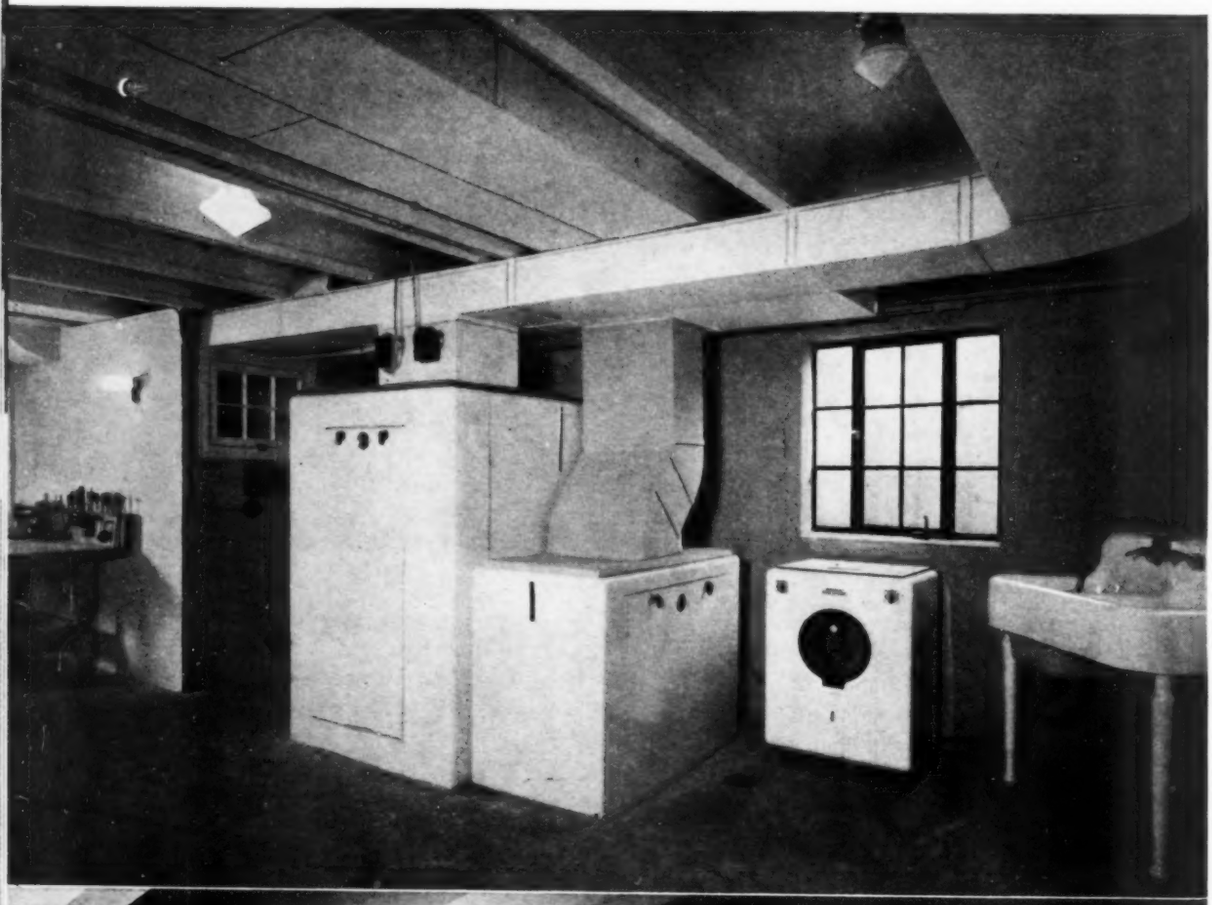
FOUNDATION: Waterproofed poured concrete with precast concrete first floor joists and floor.
EXTERIOR: Common brick veneer, first floor; siding over Insulite Bildrite sheathing on the second floor.
ROOF: 5/8" butt red cedar edge-grained shingles; gutters, redwood.
FRAMING: Studs, joists, rafters and beams, and similar members, 4-Square No. 1 Y.P. Roof rafters, 2 x 6 spaced 16" o.c. with 1 x 6 collar beams 32" o.c.
WINDOW FRAMES, TRIM & DOORS: Morgan doors; exterior, weatherstripped; frame 1¾" thick. Exterior trim, clear cypress.
FLOORS: Heavy paraffin paper over subfloors before finish floors are laid. Finish floors, No. 1 red oak, except Congoleum linoleum in entrance hall, baths and kitchen; Tile-Tex in balance of first floor rooms.
LATH & PLASTER: 3-coat plaster on Insulite Lok-Joint lath for exterior walls, and Rocklath on interior walls. Corner beads on exposed corners.
ADDITIONAL INSULATION: Spun glass batts above second floor ceiling.
HEATING: Winter air conditioning system—Rudy 115,000 B.T.U. unit with Link-Belt bin feed anthracite stoker and automatic ash elevator delivering to cans outside. Garage heated with separate Rudy gas furnace. Janitrol domestic hot water heater.

(Continued to page 62)

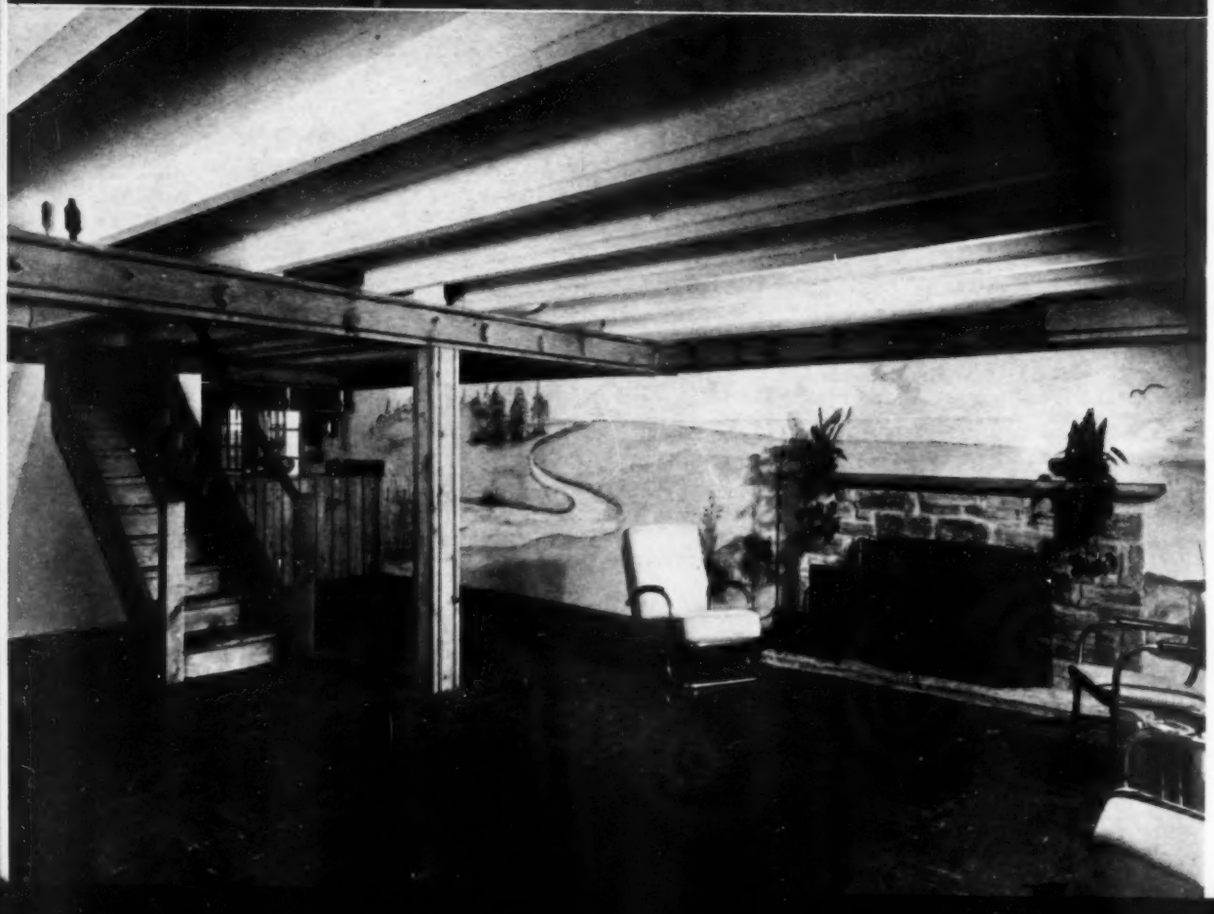
ABOVE: Master bath has dressing table cabinets flanking lavatory and built-in shelves above: recessed tub can be seen in mirror.

Specifications *(Continued from page 61)*

PLUMBING FIXTURES: Kohler.
HARDWARE: For house, Schlage; garage, Frantz.
KITCHEN: Walls, Vitrolite; cabinets, Modern Steel Equipment Co.; lumiline lighting; IIg ventilating fan; Chambers gas stove; Hammond built-in electric clock.
GLAZING: Libbey-Owens-Ford grade A.
EXTERIOR PAINTING: Cabot's double white.
SPECIAL FEATURES: Attic ventilating fan; complete home laundry with combination sink and laundry tray, the former for use at recreation room bar; master light switch to turn on lights for entire ground floor and grounds, located in master bedroom; Rittenhouse door chimes; gas fireplace lighter.



LARGE steel casements give adequate daylight in utility room of W. C. Huggins' demonstration home. The tightly sealed anthracite coal bin connected to stoker with bin feed is seen at the left.

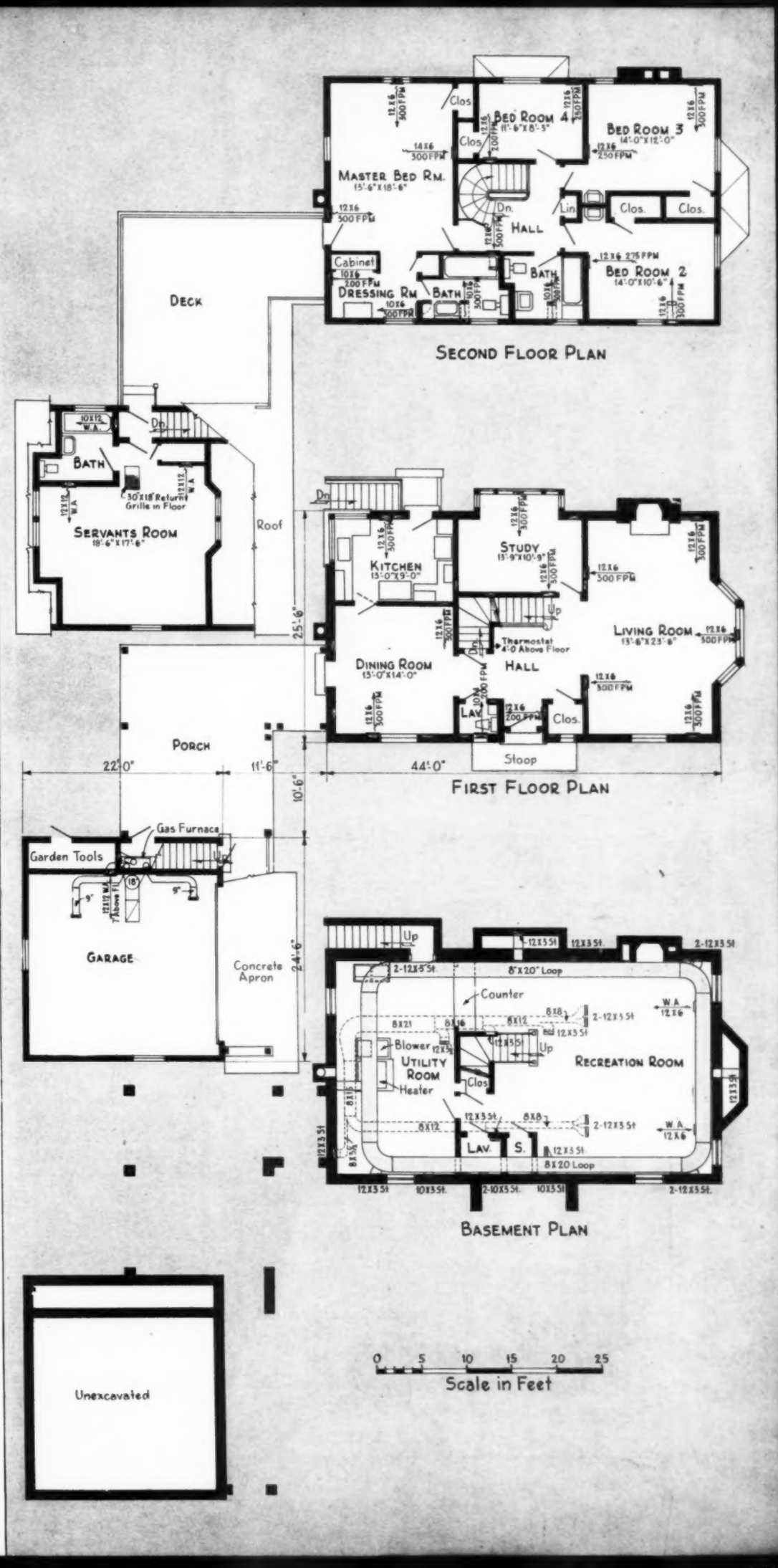


RECREATION room walls have mural decorations lighted by concealed fixtures behind knotty pine trimmed beams. Note counter in the background for refreshments; built-in cupboard space behind allows food storage and Venetian blind screens view of preparation.

SEE PAGES 60, 61 FOR EXTERIOR VIEW AND OTHER DETAILS

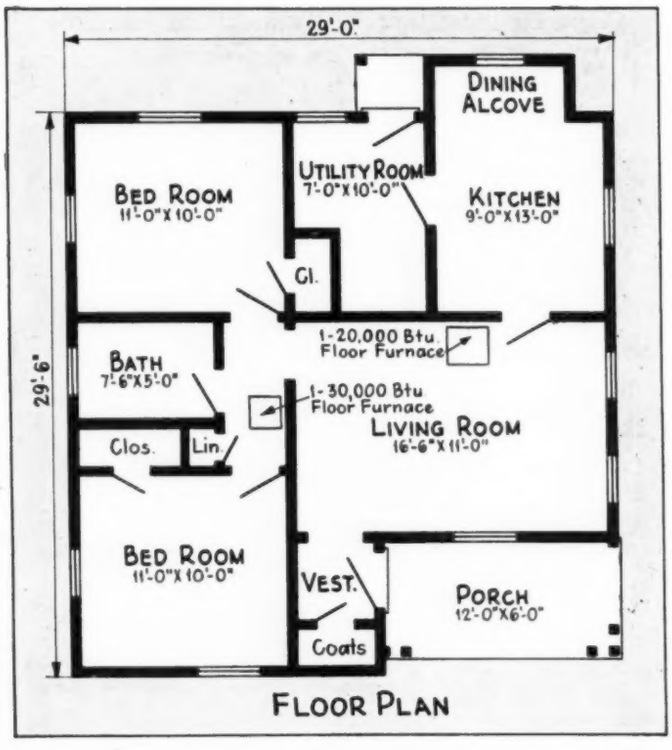
UNUSUAL features of plan in this W. C. Huggins' exhibition home are the generously proportioned stair hall, large, well lighted living room, economical grouping of baths and lavatories, screened in L-shaped porch connecting house and garage with sun deck above to give access from second floor to servants' quarters above the garage.

BASEMENT plan shows layout of winter air conditioning system, consisting of Rudy unit equipped with Link-Belt automatic anthracite bin feed stoker, and ash remover which extracts ashes from base of heating unit and delivers them to cans outside.



Alcove and Utility Room in Louisville Cottage

E. L. Bailey, Builder



E. L. BAILEY of Louisville designed and built this house, and selected the modern gas equipment that makes it popular with the buyers. It is heated with 2 Sunbeam floor furnaces by the Fox Furnace Co., and is also equipped with a Belknap gas range and a Hotstream gas water heater. The floor plan is of an inexpensive type that is practical and successful. The front porch is well proportioned and most attractive, and the manner in which a coat closet has been worked in alongside the front door is good.

THE DINING ALCOVE, which is a part of the kitchen, projects towards the rear and gives a little added space where it is much appreciated. There is a utility room off the kitchen, which is an important feature. Builder Bailey uses an 8-inch concrete foundation, frame construction with clapboard exterior, a roof of colorful asphalt-composition shingles. The front porch and steps are of concrete.

PruCost
Reg. U.S. Pat. Off.

Figures for American Builder Homes

HOME DESIGNS ON PAGES AS NUMBERED

Units of Construction	Sept. 47	Sept. 49	Sept. 50	Sept. 51	Sept. 52	Sept. 53
Basement Walls, lin. ft.	100	114	145	125	98	90
Trench Walls, lin. ft.	121	113	32	71	90	87
Basement Floor, sq. ft.	577	618	930	655	540	450
Garage Floor, sq. ft.	304	220	0	180	290	210
Excavation per ft. deep, cu. yds.	26.5	27	39	28	25.5	21.5
Outside Walls, squares	29.65	26	20.50	24	26	25
First Floor, squares	6.12	6.50	5.50	7.10	5.88	5.00
Second Floor, with Fin. Flg., sqs.	6.12	6.23	4.40	7.80	5.88	5.00
Second Floor, without Fin. Flg., sqs.	0	0	2.70	0	0	0
Ceiling, sqs.	9.16	8.43	9.90	8.90	8.18	7.10
Roof Pitch, inches rise per ft. run	9″	9″	13″	9″	9″	12″
Roof, squares	13	11	14.70	13	10.5	9.10
Hips and Valleys, lin. ft.	0	0	42	20	72	0
Cornice, type and lin. ft.	C & F-120	C & F-191	C & F-108	C & F-105	C & F-40	C & F-173
Cornice, type and lin. ft.	6″-100	0	6″-67	8″-74	10″-128	24″-25
Partition, lin. ft.	132	166	117	223	127	115
Inside Finsh OS Walls, lin. ft.	200	215	145	235	196	180
Front and OS French Doors, opgs.	2	4	1	2	2	2
Rear and Grade Doors, opgs.	2	2	1	1	1	2
Garage Doors 8 ft. wide	2	1	2	1	1	1
Inside Doors and Cased Opgs., opgs.	13	16	11	20	12	11
Windows and Casements, opgs.	22	20	22	24	21	18
Gable Sash and Louvers, opgs.	3	1	3	3	0	1
Chimney, lin. ft.	38	37	32	35	35	36
Main Stairs	1	1	1	1	1	1
Porch Floor, sqs.	5.68	3.32	1.70	1.32	1.36	1.26
Porch Ceilings, sqs.	2.60	3.25	1.53	1.04	.86	.84
Porch Beam, lin. ft.	24	64	30	30	28	32
Porch and Balcony Post and Newels, No.	14	8	6	4	4	5
Porch Roof, sqs.	1.68	2.75	1.90	1.40	1.30	1.26
Porch Cornice, lin. ft.	24	33	34	34	32	35
Porch and Deck Rail, lin. ft.	20	36	0	7	8	6

HOME DESIGNS ON PAGES AS NUMBERED

Units of Construction	Sept. 54	Sept. 56	Sept. 57	Sept. 58	Sept. 60	Sept. 64
Basement Walls, lin. ft.	111	0	0	0	156	0
Trench Walls, lin. ft.	51	190	237	378	160	153
Basement Floor, sq. ft.	700	0	180	0	1044	65
Garage Floor, sq. ft.	180	0	234	400	726	0
Excavation per ft. deep, cu. yds.	31.5	0	0	0	52	0
Outside Walls, squares	20	18.20	18.23	36	46	15.30
First Floor, squares	7.56	14.30	9.08	19.80	11.72	7.35
Second Floor, with Fin. Flg., sqs.	4.39	0	0	0	16.56	0
Second Floor, without Fin. Flg. sqs.	1.86	0	0	8	0	0
Ceilings, sqs.	9.36	14.30	13.22	23.80	19.14	8
Roof Pitch, inches rise per ft. run	11″	7″	12″	12″	8″	8″
Roof, squares	14.25	17.50	20	30.60	23	12.35
Hips and Valleys, lin. ft.	28	240	100	104	84	52
Cornice, type and lin. ft.	C & F-160	C & F-16	C & F-98	C & F-390	C & F-222	C & F-150
Cornice, type and lin. ft.	6″-71	8″-180	8″-128	12″-34	6″-208	0
Partition, lin. ft.	230	200	153	250	398	110
Inside Finish OS Walls, lin. ft.	208	182	136	270	378	122
Front and OS French Doors, opgs.	1	1	1	5	2	1
Rear and Grade Doors, opgs.	2	1	1	4	7	1
Garage Doors 8 ft. wide	1	0	1	2	2	0
Inside Doors and Cased Opgs., opgs.	20	16	13	22	27	11
Windows and Casements, opgs.	23	20	14	29	37	11
Gable Sash and Louvers, opgs.	0	0	1	4	3	3
Chimney, lin. ft.	31	26	24	24	74	24
Main Stairs	1	0	0	0	2	0
Porch Floor, sqs.	.45	1.8	.16	3.15	5.20	8.7
Porch Ceilings, sqs.	.34	1.6	0	2.91	5.80	7.7
Porch Beam, lin. ft.	18	9	0	43	104	25
Porch and Balcony Post and Newels, No.	6	3	4	11	12	7
Porch Roof, sqs.	.60	0	0	3.68	4.34	0
Porch Cornice, lin. ft.	20	0	0	0	0	0
Porch and Deck Rail, lin. ft.	0	3	16	0	70	0

Necessary Home Equipment, Fixtures, Accessories, Extras

Since the above surveyed items cover only the actual superstructure of the house, you should figure and add the following items as specified or wanted (and don't forget Overhead and Profit):

Areaways, Cellar Sash, Coal Chute, Basement Partitions & Doors, Attic Flooring, Attic Stairs, Blinds, Gutters & Downspouts, Fireplaces, Built-in Cabinets, Rail & Newels for Stairs and Stair Well, Beamed Ceiling, Weatherstrips, Tile Work, Plumbing, Heating & Air Conditioning, Lighting, Terraces, Patio Walls or Fences, Sidewalks including Porch Steps, Driveways, Unattached Garages. Also add for painting and decorating if not included in Unit Costs.

Principles of Central Heating Systems

A Review of Relative Advantages of Today's Popular Types of Heating

BECAUSE in most sections of the country the heating system may account for 10% or more of the cost of the house and because there is a great deal of misunderstanding as to features of different types, this article presents some fundamental considerations on central heating systems. Today the central heating plant means a system offering a high degree of efficiency, and one that is beautiful to look at as well. It is possible to make use of the valuable space in the basements of homes for recreation purposes, workshops, etc., or it is even possible to build a home without a basement and still obtain the advantages that are found only in the central heating system.

Central heating systems are basically of two types. In one, air is warmed in a furnace and distributed by means of ducts to registers in each room. This circulation may be by gravity, relying upon the fact that warm air rises and cold air falls, or the system may have a fan to force the warm air through ducts into the room.

The other system of central heating is the use of steam or hot water produced in a boiler and circulated through pipes to radiators in each room. This circulation may be by gravity, or may be forced as in the case of forced hot water heating. Steam heating, too, may be accomplished by gravity circulation or through circulation created by the development of a vacuum in the system which tends to speed up the movement of the steam. Both warm air heating and steam or hot water heating have many advantages; therefore, it is necessary to sort out the particular advantages and to arrange them in such order that the final analysis will clearly show which particular system is the type desired for the particular job.

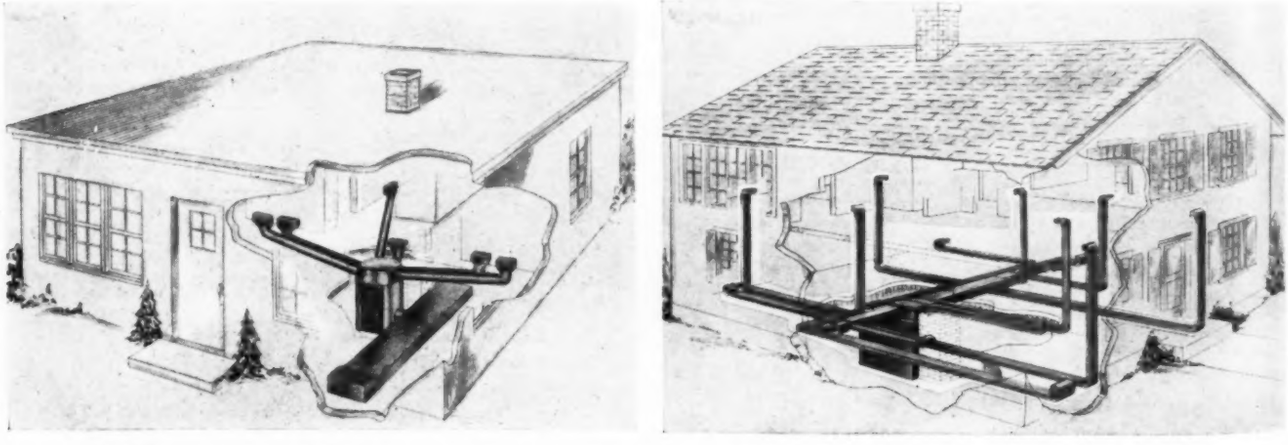
Warm Air

The warm air furnace in its simplest form may be cheaper to install than either a steam or a hot water system; however, when it is desirable to obtain all the advantages which a warm air system has to offer, such as forced circulation, filtration, humidification and washing of the air, it is necessary to go to a more expensive type of system. Such a system includes a greater amount of ducts, for carrying the warm air from the furnace to the room, and a more elaborate system of cold air return ducts. However, all these advantages are worth while and should be carefully considered in the choice of a heating system. Warm air systems heat rapidly; ordinarily as soon as the fire is started, one can feel warm air from the register. Warm air heating, however, provides only convection current heating. Registers, of course, may be installed in the walls, leaving all the floor area free for the placing of furniture. Because of the dependence of warm air heating on the free circulation of air, it is usually advisable to install registers on inside walls. By so doing, the currents of warm air that blow from the register are not affected by the infiltration of cold air through windows.

Of course, in warm air systems where a fan is used to speed up the circulation of air, it is possible to obtain a greater flow of air at all times when the furnace is operating; however, even under such conditions, it is advisable to have registers on inside walls. In the case of gravity warm air systems, it is also necessary to install the furnace as close to the center of the basement as possible, so as to reduce the length of the ducts leading to the registers in the room. But in the case of forced warm air, more latitude in the location of the furnace is possible, as the fan installed in the system increases the circulation sufficiently to force air through the ducts. Even the register farthest from the furnace is supplied and a sufficient volume of warm air to every room is assured.

In warm air heating, when the fire is checked or the fan is shut off, the air in the room begins to cool immediately. This action tends to produce what may be undesirable fluctuations in the temperature of the house. However, it has its advantages in providing rapid checking of the heat in the house in early spring and fall when very little heat is desired.

Steam and hot water heating on the other hand may be somewhat more expensive to install than the simplest of warm air systems, but in a system comparable in all respects, there is likely to be very little, if any, difference in the original cost. Because of inherent features in steam and hot water systems, it is logical to expect that operation and maintenance cost will probably be lower over the years. Steam is slightly less flexible in its use than hot water, because it is impossible to obtain any heat until the water in the boiler has been brought to a boil. But steam will heat a room quicker than hot water because



ABOVE: Typical installations of gravity warm air system (left) and forced warm air plant (right) as used in homes.

of the higher temperature of the steam. With hot water, on the other hand, a high degree of flexibility is obtainable; and it is possible to obtain warmth from water of very little temperature. This, of course, means that almost as soon as the water in the boiler starts to heat, it begins circulating to the radiators.

Steam and Hot Water

Both systems have this in common: They cool slowly when the fire is checked; steam is slightly faster in cooling than water. But because they are both contained in a cast iron radiator which is slow to cool, this tends to retard the cooling off of the house and assures a more even temperature.

In steam or hot water heating, radiators are used as the heating element in the room—these provide a combination of infra-red ray radiation heating and convection heating. When radiators are used as room heating elements it is logical to place them against outside walls, preferably under windows where they can heat the cold air which filters in around the windows and provide a higher degree of heat along cold outside walls, eliminating the chills which occur due to heat losses through the walls. With such a system, the heating medium being carried to the room radiators in pipes, the boiler can be installed at any location in the basement that is desired. Pipes for upper floors, being small, are readily placed between partitions in old buildings, where it is necesary to replace the present heating system.

While the major objection in the past has been to the amount of floor space used by a radiator and its ungainly appearance, today radiators are made with small tubes and occupy very little floor space, or can be completely recessed in the walls if desired. If preference leans toward a unit similar in outward appearance to a warm air register, it is possible to obtain a convector radiator which completely recesses into the wall and allows only the grille to be seen. However, in such cases the room is heated only with convection currents similar to warm air heating. Steam or hot water heating systems, too, can be equipped with devices for humidifying, filtering, and washing the air when desired, as explained further on.

Winter Air Conditioning

Winter "air conditioning" usually means the heating, humidifying, filtering and washing of air. Of these, heating is by long odds the most important. And unless a winter air conditioning system provides adequate, fully controlled heat, no amount of air treatment can compensate for that omission.

There are practical means for securing proper air humidification, filtration and washing. For instance, a gravity type warm air heating system can be equipped with a humidifying device, and a forced warm air system can be equipped to provide all three—humidification, filtration and air washing—because of the extra force obtained through the use of a fan. Of these three stages of air conditioning, the next in importance to heating is humidification. However, in this regard, it is well to bear in mind that the desire to humidify the air in an entire home should not necessarily be the deciding factor in choosing a particular type of heating system. For as a matter of fact, many of the rooms in a home do not require additional humidification. For instance, the kitchen ordinarily receives enough humidity from cooking; and the bathroom, of course, is usually unneedful of further humidification. Bedrooms are occupied only at night and then it is desirable to have the windows open; therefore, in most parts of the country, sufficient moisture is obtained from the night air to satisfy the needs for humidification. Eliminating such rooms may then leave only two rooms in the home that may actually require additional humidification—the living room and dining room.

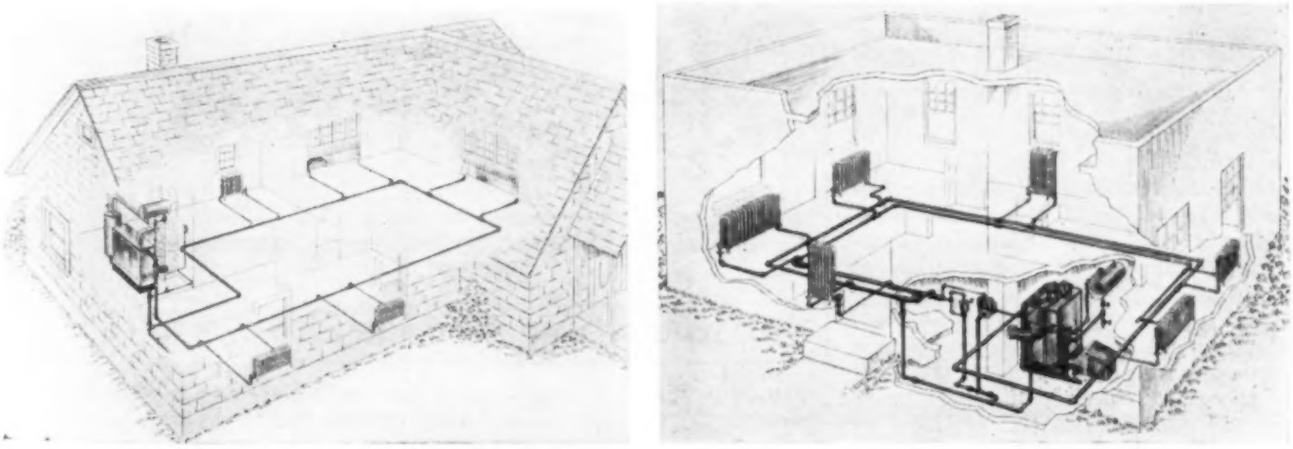
However, winter air conditioning, including the warming, humidifying, filtering and circulating of air, aids in maintaining health and comfort during the cold months. In general this may be accomplished in a warm air system or a split system (described later in this article) by means of ducts which deliver the filtered, humidified air to the various rooms of the house.

A recent development designed to provide these benefits of winter air conditioning in conjunction with a steam or hot water heating system without the necessity of running ducts between the walls and floors has already been mentioned. This unit, in addition to providing humidification and filtration of the air, also heats it, supplementing or entirely replacing the radiator in such rooms. Through a register in the floor room air is drawn, filtered, humidified and heated and discharged through a register in the wall. Such a unit will provide sufficient humidification for a large portion of the average home. In larger homes more than one unit can be installed as desired.

The Split System

As the name suggests, the split system is a combination of steam or hot water heating and warm air heating. In the application of this system, it is usual to heat most of the rooms of a house with radiators. Certain selected

(Continued to page 94)



ONE-PIPE forced hot water installation (left) and two-pipe steam or vapor heating (right) using radiators and convectors.

Engineering a SOUND Heating System

AS A practical engineer in the heating field for the past 25 years, I have seen practices in the small home field, and particularly the speculative small home field, that would make your hair stand on end. Such practices cost everybody money. It is not only the owner —but the contractor and subcontractor—who suffer through loss of reputation and the endorsement that should be given by a satisfied owner.

Even the smallest home today presents an engineering problem in planning its heating that should *never* be entrusted to some "twenty-minute expert" who gives you a quick figure from the book or follows some so-called short-cut method. Some of this is permissible for preliminary survey purposes by which some general idea is had as to the size of equipment required, the number of registers and grilles which should be installed, *but it does not make the plan.*

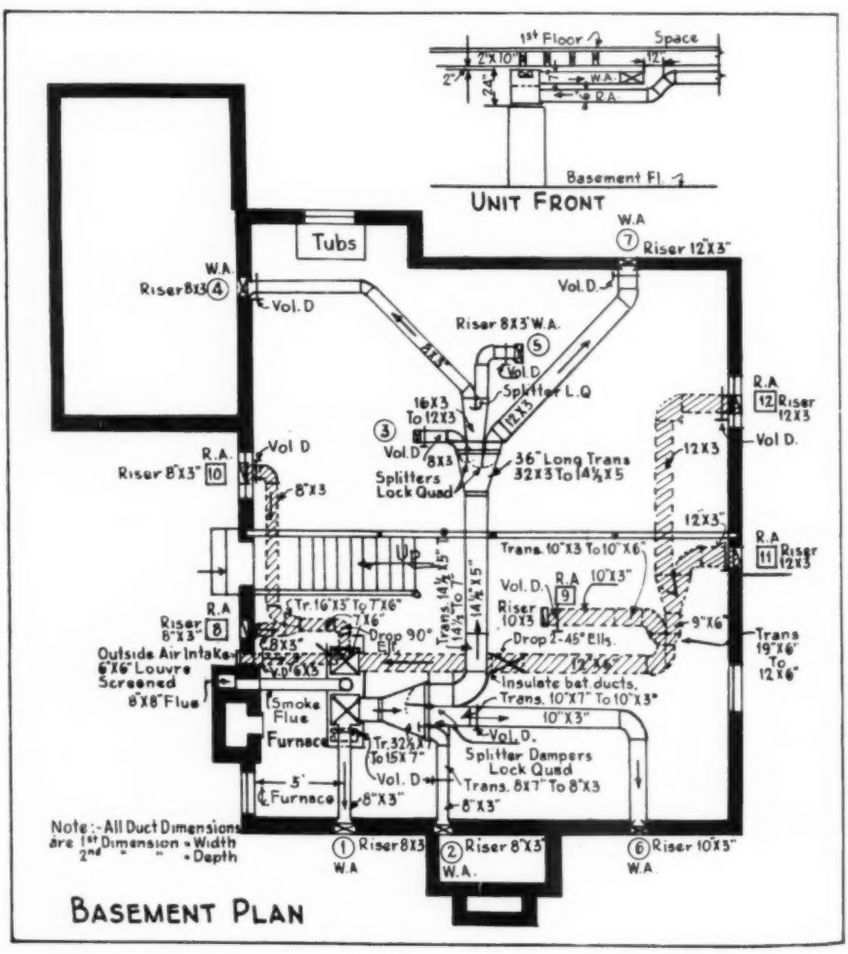
When some one tells you he can plan and estimate a heating system for a home—any kind of a home—in a few hours, and proceeds to do so on such short notice, *look out!* The modern heating and air conditioning system is not the kind of simple problem that can be satisfactorily solved that way.

The heating plant should be carefully planned and engineered by a competent heating engineer, and the complete details shown *on a special set of heating plans.* The heating plant is the heart of the house, the most important item of its fixtures; you most certainly would consult the most reputable doctors for a heart ailment. You employ a good architect; why not do the same about the very important heating item by having a properly qualified heating engineer plan your heating installation?

The work should be done far enough in advance so that the engineer has ample time to properly figure heat losses without undue haste—which leads to easily made errors—consult his reference data, analyze building construction, and do a thoroughly careful and meticulously worked out job. This pays untold dividends by having owners "shout to the high heavens" about the perfect comfort and trouble-free satisfaction in their home in your development. Rather have them do this than voicing their dissatisfaction—not only to you, but to the world in general where it will do harm to prospective buyers—as well as unjustly condemning small home air conditioning installations because the builder tried to save a few dollars in the beginning between a good and an indifferent installation as well as equipment.

Frequently an architect or builder is so "tight" with the blueprints and specifications that he fails to supply the heating man with a complete set immediately the architect's plans are ready for release. Either the architect or builder usually have two or three sets of blueprints of the house. They peddle them around among the various crafts for estimates and these people often hold them for lengthy periods. By the time—at the last minute—when the builder is about ready to construct he suddenly gets in touch with the heating man on a matter that should have been taken care of in the beginning. It takes time to prepare a satisfactory heating plan and calculations, and the builder should not wait until he is framing before he goes into the heating subject. This writer has turned down many opportunities to handle building propositions when they are placed before him in the framing stage, or "we are beginning to build in a couple days."

This is an entirely wrong attitude. To make a satisfactory heating estimate and plan, the engineer must have complete information about construction materials, wall, floor, ceiling and roof areas, glass and door types and dimensions, etc. He should have a complete set of the specifications also. From the ordinary architectural blueprints he should prepare detailed plans showing the heating installation in such a clear and complete fashion as to eliminate all guesswork by the heating installer. These plans should have complete instructions lettered on them and should be prepared before the framing begins so there is a clear knowledge on the part of everyone concerned



HEATING PLAN of a typical small job made by engineer Kautzmann for an operative builder. This follows the new revised Technical Code of the National Warm Air Heating and Air Conditioning Association, is scientifically planned and laid out and provides complete data for estimating a satisfactory job.

By JOHN J. KAUTZMANN
Heating and Air Conditioning Engineer

Straight-from-the-Shoulder Advice on How to Plan and Install Jobs that Make Ardent Boosters of Your Customers

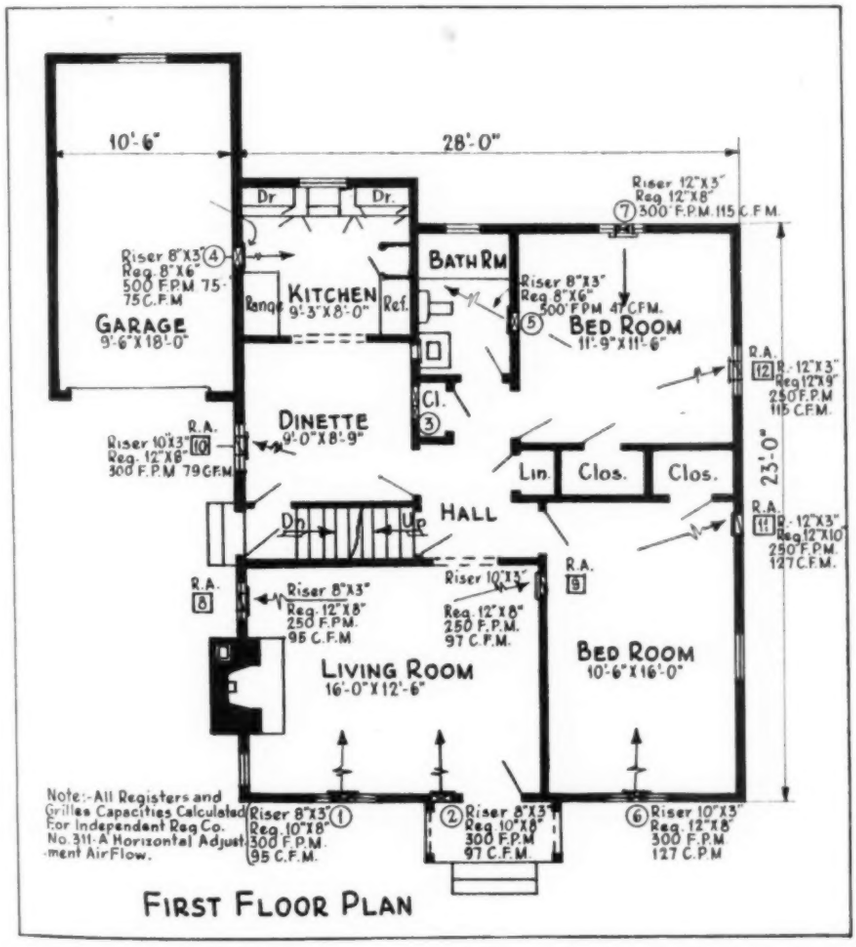
about how the heating installation is to be handled, how many registers there are, their location, and where the ducts are to go.

Important for Speculative Builders

It is particularly important for the speculative builder erecting a number of homes from the same general plan to have his basic design, and the variations of it, properly figured by a qualified heating engineer in advance of building operations. Such a plan can save him money because the subcontractors bidding on these plans know exactly what is expected of them. They are all bidding on the same heating layout—duct, registers and grilles—the only difference there may be is in the particular make of heater offered, but this heater as offered, regardless of the make, must conform to the engineer's specification as to heating capacity with a reserve capacity to avoid overloading or forcing the plant. This procedure eliminates inequalities in offerings by several

(Continued to page 98)

ABOVE: THE AUTHOR—John J. Kautzmann—and FRONT ELEVATION SKETCH of small speculative home in which warm air heating system was engineered, as shown in the plans at left, by him.



SCIENTIFIC ANALYSIS of heat losses, backed by sound engineering knowledge of warm air heating, should be back of every job, as was the case in the small home above. Note that the size of register, riser, air velocity and capacity are clearly indicated at each opening on the floor plan.

13 Guiding Points

1. Have complete heating plans prepared by competent local heating engineer.
2. Don't buy on price alone.
3. Consider exposure—figure every job separately.
4. Install adequate capacity—provide 20 to 25 per cent reserve.
5. Consider air friction—avoid sharp duct bends.
6. Provide sufficient returns—at least one from every room.
7. Locate registers scientifically.
8. Make thorough construction material analysis based on complete blueprints and specifications.
9. Make room by room analysis, figuring heat losses accurately.
10. Make allowance for temperature differences.
11. Provide insulated ducts where needed.
12. Follow revised new technical code of National Warm Air Heating and Air Conditioning Association.
13. Have frequent heating inspections by qualified engineer during installation.

$100 Heats 54 x 34 Ft. Country Home

Low Cost Attributed to Meticulous Care in Design and Installation of Stoker-Fired Warm Air Job

HERE is a striking fact about quality heating:—*the amount saved each year due to the economical operation of this plant is enough to pay the interest and 20-year amortization cost on the entire system!* In other words, the owner gets his heating plant for nothing, because (a) the plant was soundly engineered and installed; (b) quality materials and equipment were used.

To the contractor or operative builder who has difficulty convincing customers it pays to do a top-notch job, the following facts should be of much value. The detailed heating analysis, engineering charts and heat loss studies serve to show the amount of engineering work that lies behind a properly planned heating job.

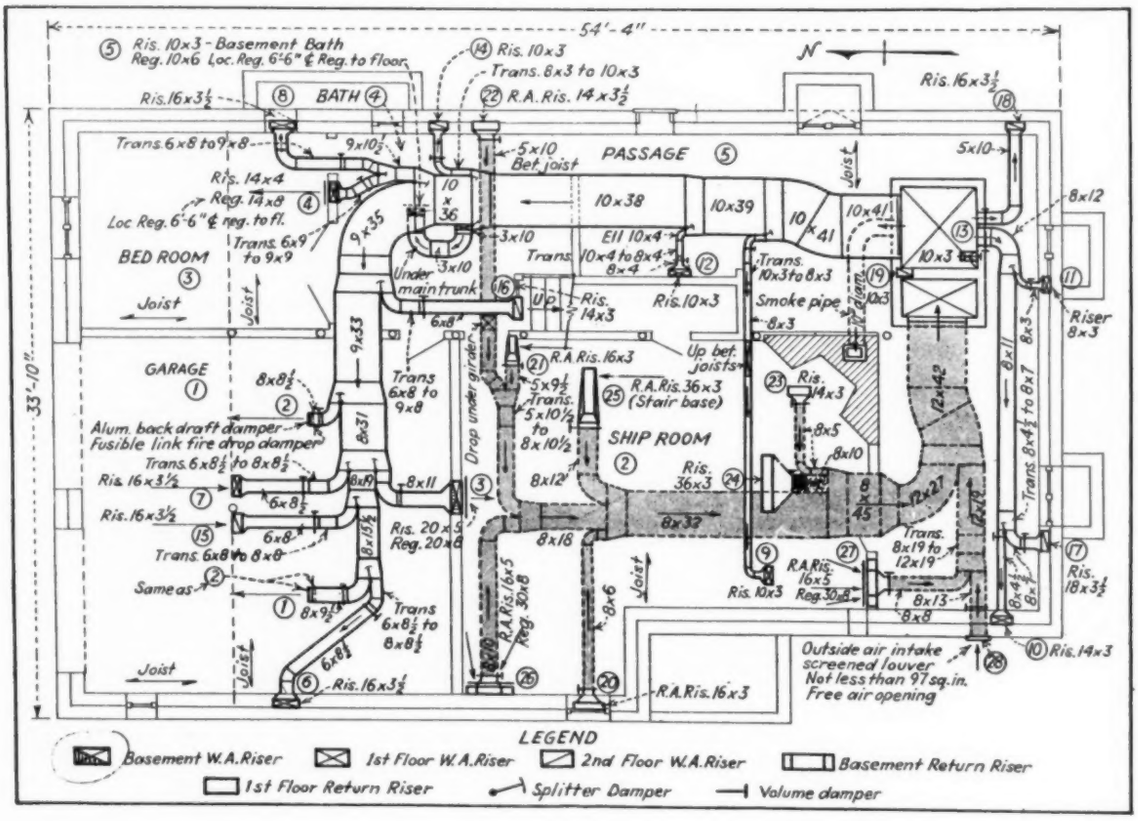
BLODGETT RESIDENCE at Basking Ridge, N. J. Properly engineered stoker-fired winter air conditioning plant detailed below.

The house is a stone and stucco residence built two years ago in the Ellsworth Dobbs subdivision at Basking Ridge, N.J., for Leo S. Blodgett, managing editor of *Marine Engineering and Shipping Review.* Robert von Ezdorf of New York was the architect, and George E. Mysel of Mt. Kemble Lake, Morristown, N.J., was in charge of construction. The house is of modern design with outdoor decks and terraces, large window expanses and extensive basement areas that are used for living purposes. Offsetting these factors that would tend to increase heating costs are the facts that it was soundly built and well insulated throughout with 4 inches of mineral wool. It is located on an exposed site on a 4½-acre tract.

The heating plant consists of a Premier direct-fired winter air conditioning unit, fed by an anthracite bin-feed, ash removal Iron Fireman stoker. The plant was engineered by John J. Kautzmann of East Orange, N.J., and installed by the Kuhles Company, Inc., of Irvington, N.J.

The heating and air conditioning installation was designed and calculated according to the new Technical Code sponsored by the National Warm Air Heating and Air Conditioning Association. In order to show a typical example of the operation of this code and the engineering analysis behind it, extensive details of the calculations of Engineer Kautzmann are reproduced with this article.

The duct system was designed on the basis of a static



HEATING LAYOUT details of basement, as prepared by Engineer John J. Kautzmann, who believes the heating blueprints should "tell everything."

of 0.08, and the installation to provide a uniform temperature of 75 degrees in all living and bedrooms and an 80 degree temperature in all bathrooms in keeping with the specific request of the owner, to insure complete comfort for his family, which includes both elderly parents and an infant son. The supply to the garage was calculated on a 70 degree room temperature, which is higher than ordinarily provided. This higher temperature was desired because of the owner's workshop occupying part of the garage.

The installation, however, includes a Duplex night and day clock thermostat located in a grilled recess in the dining room wall adjacent to the door leading to the kitchen. This instrument permits the occupants to provide themselves automatically with any degree of heat they may desire at any time.

Engineer Kautzmann not only figured heat losses and laid out the system with meticulous care but detailed the job on separate blueprints in a way that left no doubt as to how it should be carried out. He believes that it is to the advantage of builder, owner and heating contractor alike to have everything down on the blueprints so that all subcontractors bid on an equal basis, with no doubt as to what is called for.

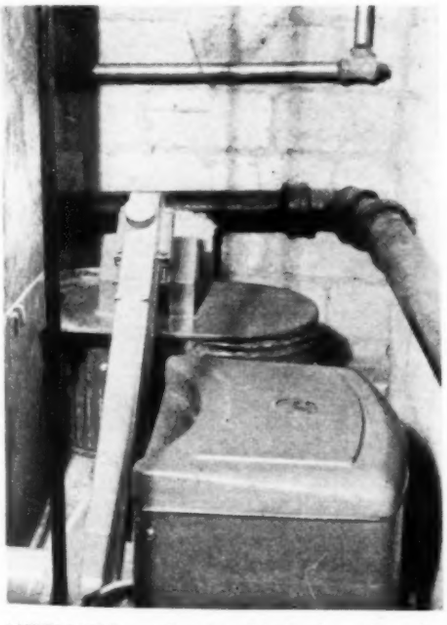
That the installation was a success is indicated by the enthusiastic endorsement of the owner, who kept a careful record of his coal bills. The total cost for the first

Table 1—Analysis of Construction from Which Transmission Coefficients and Factors for Temperature Difference Were Derived

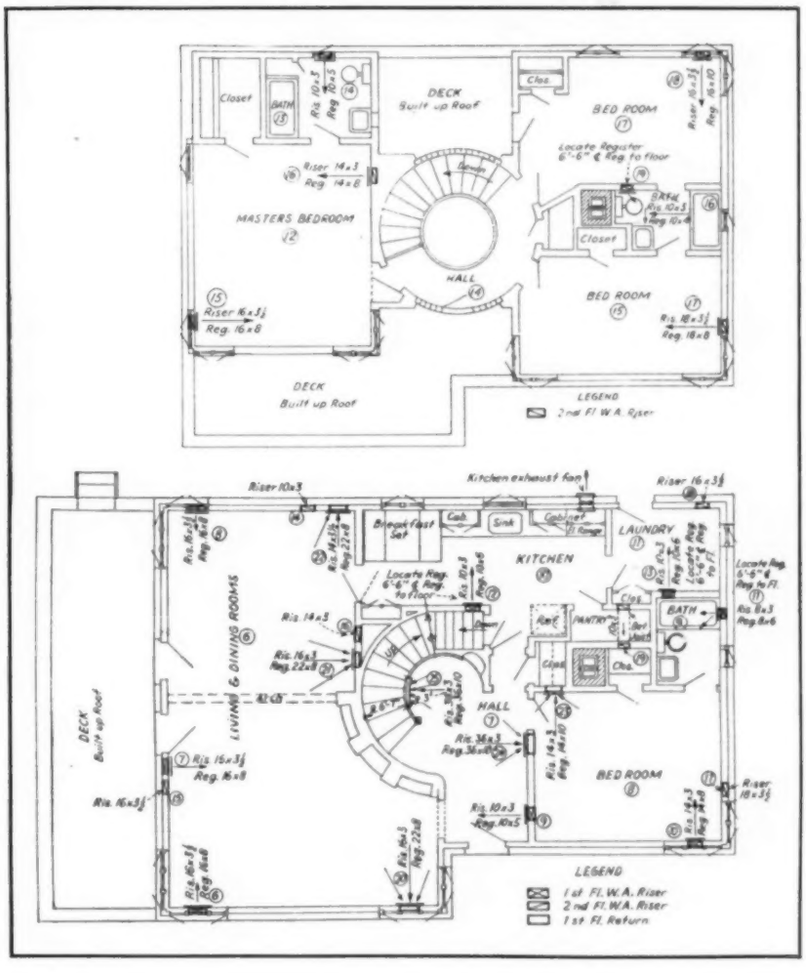
Room No.	Construction—WALLS	Room Temp.	C. E. U 1°-TD	Factor for Temp. Diff.
Basement				
1—Garage	Exterior: 8-in. cement block, faced with 8-in. cut stone veneer above grade	70	70x0.42	=29.4*
	Interior: ½-in. cement plaster. No insulation	....	38x0.42	=15.96†
2—Ship room	Exterior: As above	75	75x0.25	=18.75*
	Interior: Pecky cypress, furred. No insulation	....	43x0.25	=10.75†
3—Bedroom	Exterior: Same as above	75	(Same as above)	
	Interior: Rock lath and plaster.			
4—Bath	Same as above	80	80x0.25	=20.00*
			48x0.25	=12.00†
First Floor				
6—Living and dining 7—Hall 8—Bedroom 10—Kitchen 11—Laundry	Exterior: 8-in. cut stone. Veneer keeyed to metal lath on studs. Interior: Rock lath and plaster. Rock wool insulation between studs.	75	75x0.074	= 5.55
9—Bath	Exterior: Same as above. Interior: Monolite panel. Rock wool insulation between studs.	80	80x0.074	= 5.92
Second Floor				
All bedrooms	Exterior: Stucco, metal lath on studs. Interior: Rock lath and plaster. Rock wool insulation between studs.	75	75x0.081	= 6.075
Baths—13 and 16	Exterior: Same as above. Interior: Monolite panel. Rock wool insulation between studs.	80	80x0.081	= 6.480
14—Hall	Glass block or hollow glass tile of 6 x 6 x 2 in. glass blocks. Wind velocity, 15 m.p.h. Still air inside surface	75	75x0.60	=45.00

*Above grade.
†Below grade.

Heating plant pays for itself—quality equipment and a thoroughly worked out and detailed heating plan



AUTOMATIC, anthracite bin-feed coal stoker supplies even, inexpensive heat.



FLOOR PLANS at right show location of supply and return registers. Original heating blueprints give size of register and riser, volume and velocity of air at each opening, thus doing away with any uncertainty on part of heating contractor in estimating or installing.

ENGINEERING SHEET

JOHN J. KAUTZMANN NEWARK, N. J.
AIR CONDITIONING HEATING
COOLING · VENTILATING EQUIPMENT

UNIT SIZE A.S.-22 Premier-Stoker Model
TOTAL B.T.U. 237,430 TOTAL C.F.M. 2947

HEAT LOSS COEFFICIENT U PER DEGREE PER HOUR: OUTSIDE WALL U_w = 0.079 / 0.081; GLASS (Gar. Doors 0.52) U_G = 1.13; INSIDE PARTITION U_P = 0.39; INFILTRATION = .018; CEILING U_C = 0.11; ROOF U_R = ✓; FLOOR U_F = 0.46; Glass Block Wall .060

OUTSIDE TEMPERATURE T = 0°F; ATTIC TEMPERATURE T = No Attic; BASEMENT WALL ABOVE GRADE U_B = 0.42; BASEMENT WALL BELOW GRADE U_B = 0.25; BASEMENT FLOOR U_F = 1.07; MEAN TEMP. GROUND BELOW GRADE = 32°

OWNER Leo S. Blodgett; ADDRESS Basking Ridge, N.J.; ARCH'T Residential Consultants Inc., Geo. E. Mysel, Supervisor; PLAN NO. ✓ DATE ✓; DEALER Kuhles Co., Inc.; ADDRESS Irvington, N.J.

PLAN NO. 3750; SHEET NO. 1; DATE 9-30-37; REVISED 10/14 10/29 Final; DRAWN BY J.J.K.; CHECKED BY J.J.K.

ROOM USE OR ROOM NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
Room Use	Garage	Ship Rm	Bed	Bath	Passage	Liv. Dining	Hall	Bed	Bath	Kitchen	Laundry	Master Bed	Bath	Hall	S.W. Bed	Bath	S.E. Bed	
ROOM TEMPERATURE — Elevation	Grade	Basement	Do	Do	Do	First Fl.	Do	Do	Do	Do	Do	Second Fl.	Do	Do	Do	Do	Do	
Room Temp.	70°	75°	75°	80°	75°	75°	75°	75°	80°	75°	75°	75°	80°	75°	75°	80°	75°	
ROOM SIZE & HEIGHT	20/0 x 20/0, 8/0	[illegible]	11/6 x 13/7, 8/0	9/6 x 4/0, 8/0	22/0 x 6/0, 8/0	L-21/2 x 16/10, D-14/8 x 14/10, 8/0	14/0 x 18/6, 8/0	14/8 x 12/2, 8/0	7/2 x 5/2, 8/0	19/0 x 7/6, 8/0	8/8 x 6/8, 8/0	14/8 x 17/2, 8/0	8/8 x 6/11, 8/0	13/0 x 13/0, 8/0	16/8 x 10/2, 8/0	8/8 x 5/2, 8/0	16/8 x 10/8, 8/0	
CUBIC CONTENTS	3200	5472	1173	304	1056	4506	2812	1427	296	1140	462	2012	479	1352	1355	362	1422	28830
GROSS SQ. FT. OUTSIDE WALL	✓	✓	✓	✓	✓	580	53	215	57	152	123	389	125	189	267	331	283	
TOTAL SQ. FT. GLASS & DOORS	112 / 791	✓ / ✓	18 / 84.75	6 / 90.40	✓ / ✓	191 / 84.75	21 / 84.75	55 / 84.75	6 / 90.40	26 / 84.75	25 / 84.75	70 / 84.75	6 / 90.40	105 / 45.0	56 / 84.75	6 / 90.40	59 / 84.75	
NET SQ. FT. OUTSIDE WALL	See Below	See Below	See Below	See Below	✓ / ✓	389 / 5.55	32 / 5.55	160 / 5.55	51 / 5.92	126 / 5.55	98 / 5.55	319 / 6.075	119 / 6.48	84 / 6.075	211 / 6.075	325 / 6.48	224 / 6.075	
SQ. FT. INSIDE WALL	✓ / ✓	160-1.95, 116-16.77	108 / 1.95	33 / 16.77	143 / 16.77	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	41 / 16.77	55 / 18.72	✓ / ✓	✓ / ✓	✓ / ✓	51 / 16.77	
SQ. FT. BASEMENT WALL ABOVE GRADE (Less Glass)	68 / 29.4	55 / 18.75	110 / 18.75	21 / 20.0	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	
SQ. FT. BASEMENT WALL BELOW GRADE	160 / 15.96	191 / 10.75	95 / 10.75	67 / 12.0	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	
SQ. FT. CEILING	170 / 7.7	✓ / ✓	93 / 8.25	✓ / ✓	✓ / ✓	77 / 8.25	36 / 8.25	✓ / ✓	✓ / ✓	100 / 8.25	✓ / ✓	278 / 8.25	63 / 8.80	193 / 8.25	179 / 8.25	50 / 8.80	187 / 8.25	
SQ. FT. ROOF	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	
SQ. FT. FLOOR	400 / 40.66	374 / 46.01	148 / 46.01	39 / 51.36	100 / 46.01	258 / 2.30	✓ / ✓	110 / 19.78	37 / 22.08	86 / 19.78	58 / 19.78	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	
INFILTRATION	108 / 139.23	✓ / ✓	25 / 70.2	9 / 74.88	✓ / ✓	174 / 70.20	20 / 70.20	43 / 70.20	9 / 74.88	36 / 70.20	37 / 70.20	90 / 70.20	9 / 74.88	18 / 70.20	72 / 70.20	9 / 74.88	72 / 70.20	
EXPOSURE	NW / 15	W / 15	NE / 15	W / 15	✓ / ✓	NW-E / 15	W / 15	W-S / 15	S / 10	S / 10	E-S / 10	N-W / 15	E / 15	W-S / 15	W-S / 15	S / 10	E-S / 10	

CALCULATIONS FOR COEFFICIENT U: Prevailing Wind - N.W. Velocity - 15 M.P.H. Infil. Factors: Steel Casement W-52.0 x 0.018 = U 0.936 x T.D. = 70.20 / 74.88; Garage Doors -110.5 x 0.018 = U 1.989 x T.D. = 139.23. Leakage per Lin. Ft. - 1

CU. CONT. 28830 / 60 = NO. AIR CHGS. 6 = C.F.M. 2883; C.F.M. 2883 / B.T.U. 237430 = Q 0.0121; REG. TEMP. 153

LONGEST ACTUAL LENGTH 63.333 / 2 = 31.666 x 1/4 + REGISTER TEMP. 153 = BONNET TEMP. 160.9

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
SQ. FT. GLASS & DOORS	8859	✓	1526	542	✓	16187	1780	4661	542	2204	2119	5933	542	4725	4746	542	5000	
NET SQ. FT. OUTSIDE WALL	✓	✓	✓	✓	✓	2159	178	888	302	699	544	1938	771	510	1282	2106	1361	
" " " INSIDE "	✓	373 / 1943	211	553	2398	✓	✓	✓	✓	✓	✓	688	1030	✓	✓	✓	855	
NET SQ. FT. BASEMENT WALL ABOVE GRADE	1999	1031	2063	420	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
" " " " " BELOW "	2554	2053	1021	804	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
" " " CEILING	1317	✓	767	✓	✓	635	297	✓	✓	825	✓	2294	554	1592	1477	440	1543	
NET SQ. FT. ROOF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
" " " FLOOR	16264	17208	6810	2003	4601	593	✓	2176	817	1701	1147	✓	✓	✓	✓	✓	✓	
INFILTRATION	15036	✓	1755	674	✓	12215	1404	3019	674	2527	2597	6318	674	1264	5054	674	5054	
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
NET B.T.U. LOSS	46029	22549	14153	4996	6999	31789	3659	10744	2335	7956	6407	17171	3571	8091	12559	3762	13813	
CORRECTION FOR EXPOSURE	4082	155	917	244	✓	4679	549	1285	152	625	526	2473	381	1223	1884	376	1296	
TOTAL B.T.U. LOSS PER ROOM PER HOUR	50111	22704	15070	5240	6999	36468	4208	12029	2487	8581	6933	19644	3952	9314	14443	4138	15109	237,430
AVERAG C.F.M. REQD. " " "0.014 x B.T.U. (0.014 = Av. Reg. Temp. 140°)	702	318	211	73	98	511	59	168	35	120	97	275	55	130	202	58	212	3,324

ENGINEERING SHEET used by Kautzmann clearly shows heat loss calculations and air requirements for every room. A thorough analysis such as this minimizes chances of mistakes and insures satisfactory low cost operation of the heating plant.

complete year's operation, using anthracite coal, was slightly under $100. The operation of the stoker is completely automatic including the ash removal.

The calculated heat loss of the building is 237,430 B.t.u. The estimated capacity of the unit at the registers is approximately 300,718 B.t.u. which provides a generous reserve of over 63,000 B.t.u. above the required building load, to care for sudden extreme low temperatures, without undue forcing of the stoker. The blowers are required to handle an air turnover of 2,947 c.f.m.

Engineer Kautzmann's method of figuring heating requirements calls for a complete analysis of the construction. Each room or space area is analyzed separately, with exterior walls, partition walls, floor, ceiling, glass and door and infiltration taken up separately. Table 1 shows how the construction analysis was carried out for exterior walls. The same procedure was followed for others areas. Obviously, to make such an analysis, a complete set of blueprints and specifications is necessary—something every architect and builder should provide without question to the heating engineer and contractor, Kautzmann declares.

Further evidence of the detailed analysis made in connection with the heating installation is shown in the engineering work sheet on this page. Here the calculations by

(Continued to page 106)

Job - New Res. Holmes Brook Rd, Basking Ridge, N.J. DESIGN C.F.M. 2883 DESIGN REG. TEMP. 153° DESIGN STATIC 0.08 OWNER Leo S. Blodgett PLAN NO. 3750

WARM AIR LAYOUT — Basement (1–5); 1st Floor (6–13); 2nd Floor (14–19). Revised 10-29-38 — Final Plan

STACK NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total
ROOM USE And No. on Our Plan	Garage #1		Ship Rm #2	Bed #4	Bath #5	Combined	Living &	Dining #6	Hall #7	Bed #8	Bath #9	Kitchen #10	Laundry #11	Master Bath #13	Master Bed Rm #12		Bed #15	Bed #17	Bath #16	
B.T.U.	25055	25056	27954	16819	5240	12163	12153	12152	4208	12029	2487	8581	6933	3952	10986	10986	17937	18601	4138	237430
ACTUAL LENGTH	51'-0"	41'-3"	51'-6"	33'-0"	31'-3"	60'-6"	51'-6"	37'-3"	29'-1"	26'-3"	13'-1"	23'-0"	9'-0"	39'-0"	63'-4"	52'-8"	32'-2"	19'-0"	17'-0"	
EQUIVALENT LENGTH	81'-0"	71'-3"	86'-6"	68'-0"	86'-3"	105'-6"	96'-6"	82'-3"	64'-1"	51'-3"	48'-1"	48'-0"	34'-0"	84'-0"	118'-4"	97'-8"	77'-2"	54'-0"	42'-0"	
REGISTER TEMPERATURE - CORRECTED	148.1	150.5	148.0	152.6	153.0	145.7	148.0	151.5	153.6	154.3	157.6	155.1	158.6	151.1	145.0	147.7	152.8	156.1	156.6	
FACTOR Q From Chart Fig. 1 Page 17	0.0127	0.0124	0.0128	0.0122	0.0121	0.0132	0.0128	0.0123	0.121	0.0120	0.0116	0.0118	0.0116	0.0124	0.0132	0.0128	0.0121	0.0118	0.0118	
C.F.M. - CORRECTED	318	311	358	205	63	160	156	150	51	144	29	101	80	49	145	141	217	220	49	2947
ROUND PIPE SIZE - BEFORE CORRECTION	9.9"	9.8"	10.4"	8.5"	5.5"	7.7"	7.7"	7.5"	5.0"	7.4"	5.0"	6.4"	5.9"	5.0"	7.4"	7.3"	8.6"	8.6"	5.0"	
CORRECTION FACTOR - TABLE 9 Page 34	0.965	0.93	0.985	0.93	0.985	1.010	1.000	0.965	0.93	0.87	0.87	0.87	0.81	0.985	1.035	1.000	0.965	0.905	0.87	
ROUND PIPE SIZE - CORRECTED	9.5"	9.1"	10.2"	7.9"	5.4"	7.7"	7.7"	7.2"	4.6"	6.4"	4.3"	5.5"	4.7"	4.9"	7.6"	7.3"	8.2"	7.7"	4.3"	
RISER SIZE	8x9½	8x8½	20x5	14x4	10x3	16x3½	16x3½	16x3½	10x3	14x3	8x3	10x3	10x3	10x3	16x3½	14x3½	18x3½	16x3½	10x3	
REGISTER VELOCITY F.P.M.	500	500	500	500	250	300	300	300	300	300	250	500	380	300	300	300	300	300	400	
REGISTER SIZE	Aluminum Back Draft Damper		20x8	14x8	10x6	16x8	16x8	16x8	10x5	14x8	8x6	10x6	10x6	10x5	16x8	14x8	18x8	16x10	10x4	
Register Location	And Fusible Link off Trunk at Ceiling		High Wall	High	High	Low	Low	Low	Low	Low	High	High	High	Low	Low	Low	Low	Low	High	

RETURN AIR LAYOUT

STACK NUMBER	20	21	22	23	24	25	26	27	28	Total
ROOM USE	Combined	Living &	Dining #6	Bed #8	Hall #7	1st Fl.	Ship Rm #2		Make up from outside	
EQUIVALENT LENGTH	81'-0"	83'-6"	116'-0"	63'-9"	51'-0"	76'-3"	90'-1"	56'-4"	27'-0"	
C.F.M. - CORECTED	160	156	150	144	436	436	313	313	839	2947
ROUND PIPE SIZE - BEFORE CORRECTION	7.7"	7.7	7.5"	7.4"	11.2"	11.2"	9.9"	9.9"	14.2"	
CORRECTION FACTOR - TABLE 9 Page 34	0.965	0.975	1.0275	0.9175	0.87	0.9475	0.985	0.8875	0.785	
ROUND PIPE SIZE - CORRECTED	7.4"	7.5"	7.7"	6.7"	9.7"	10.6"	9.7"	8.7"	11.1"	
STACK SIZE	14x3½	14x3½	16x3	14x3	36x3	36x3	19x4½	18x4	8x13 outlet	
R.A. REGISTER OR GRILLE VELOCITY F.P.M.	200	200	200	250	250	250	250	250	Screened Louver	
R.A. REGISTER OR GRILLE SIZE	22x8	22x8	22x8	14x10	36x10	36x10	30x8	30x8	968 Sq. inch	
Grille Location	Base Bd.	B.B.	B.B.	B.B.	B.B. in Wall	Curved Stair B.B.	B.B.	B.B.	Free open Area	

DUCT LAYOUT

Warm Air - Main Trunk - Basement Duct -

STACK NO.	BRANCH TRUNK C.F.M.	MAIN TRUNK C.F.M.	RD. PIPE BEFORE CORR.	CORR. FACTOR	RD. PIPE CORR.	RECT. EQUIV. D. — W.
6-Liv'g	160	—	7.7"	1.010	7.7"	6x8½
1-Gar.	318	—	9.9"	0.965	9.5"	8x9½
—	—	475	11.6"	1.035	12.0"	8x15½
15 Master Bed	145	—	7.4"	1.035	7.6"	6x8
—	—	623	12.7"	1.035	13.1"	8x19
3-Ship Rm	358	—	10.4"	0.985	10.2"	8x11
7-Liv'g	156	—	7.7"	1.000	7.7"	6x8½
—	514	1137	16.0"	1.035	16.5"	8x31
2-Gar.	311	—	9.8"	0.93	9.1"	8x8½
—	—	1448	17.5"	1.035	18.1"	9x33
16 Master Bed	141	—	7.3"	1.000	7.3"	6x8
—	—	1589	18.0"	1.035	18.6"	9x35
—	—	—	—	—	—	—
8-Dining	150	—	7.5"	0.965	7.2"	6x8
4-Bedroom	205	—	8.5"	0.93	7.9"	6x9
—	—	355	10.4"	1.035	10.7"	9x10½
—	—	1944	19.5"	1.035	20.1"	10x36
14-Bath	49	—	5.0"	0.985	4.9"	8x3
5-Bath	63	—	5.5"	0.985	5.4"	3x10
Forward	2056	2056	19.75"	1.035	20.4"	10x36

Check → 2056

Warm Air - Main Trunk - Basement Duct -

STACK NO.	BRANCH TRUNK C.F.M.	MAIN TRUNK C.F.M.	RD. PIPE BEFORE CORR.	CORR. FACTOR	RD. PIPE CORR.	RECT. EQUIV. D. — W.
Brought Forward	2056	2056	19.75"	1.035	20.4"	10x38
12-Kit	101	—	6.4"	0.87	5.5"	8x4
—	—	2157	20.0"	1.085	20.7"	10x39
9-Hall	51	—	5.0"	0.93	4.6"	8x3
To Plenum	—	2208	20.5"	1.035	21.2"	10x41
Check → 2208						
W.A. - Duct Lines Along South Wall						
10-Bed #8	144	—	7.4"	0.87	6.4"	8x4½
17-Bed #15	217	—	8.6"	0.965	8.2"	8x7
—	—	361	10.4"	0.965	10.0"	8x11
11-Bath #9	29	—	5.0"	0.87	4.3"	8x3
To Plenum	—	390	10.7"	0.965	10.3"	8x12
Check → 390						
W.A. - Single Line to Plenum Along South Wall						
18-Bed #17	220	—	8.6"	0.905	7.7"	5x10

Warm Air - Basement Duct -

STACK NO.	BRANCH TRUNK C.F.M.	MAIN TRUNK C.F.M.	RD. PIPE BEFORE CORR.	CORR. FACTOR	RD. PIPE CORR.	RECT. EQUIV. D. — W.
W.A. - Single Lines Off Plenum Top →						
13-Ldry	80	—	5.9"	0.81	4.7"	3x10
19-Bath #16	49	—	5.0"	0.87	4.3"	3x10
W.A. - Check						
North Trunk	2208					
South - " -	390					
South Single	220					
#13 - " -	80					
#19 - " -	49					
Total	2947 W.A.					

Return Air - Basement Duct -

STACK NO.	BRANCH TRUNK C.F.M.	MAIN TRUNK C.F.M.	RD. PIPE BEFORE CORR.	CORR. FACTOR	RD. PIPE CORR.	RECT. EQUIV. D. — W.
22-Dining	150	—	7.5"	1.0275	7.7"	5x10
21-Liv-Dining	156	—	7.7"	0.975	7.5"	5x9½
—	—	306	9.8"	1.0275	10.0"	8x10½
26-Ship Rm	313	—	9.9"	0.985	9.7"	8x10
—	—	619	12.7"	1.275	13.0"	8x18
20-Liv'g	160	—	7.7"	0.965	7.4"	8x6
25-Hall Stair	436	—	11.2"	0.9475	10.6"	8x12
—	596	1215	16.5"	1.275	16.9"	8x32
23-Bed #8	144	—	7.4"	0.9175	6.7"	8x5
24-Hall Wall	436	—	11.2"	0.87	9.7"	8x10
—	580	1795	19.0"	1.0275	19.5"	8x45
—	—	—	—	—	To Ell	12x27
—	—	—	—	—	—	—
27-Ship Rm	313	—	9.9"	0.8875	8.7"	8x8
28-Makeup	839	—	14.2"	0.785	11.1"	8x13
—	1152	1152	16.25"	1.0275	16.6"	12x19
To Plenum		2947	23.0"	1.0275	23.6"	12x42
Check → 2947						

SIZING of warm air and return ducts in the Blodgett residence is carefully detailed in this engineer's work sheet.

Air Conditioning Today

No. 3. What To Do About It

by HARRY M. HITCHCOCK

Editor, Information Bureau, National Warm Air Heating and Air Conditioning Ass'n.

THIS is the third of a series on the present status of domestic air conditioning.

THERE'S one rule to which I have never seen an exception—*When the tide comes in, the driftwood is first to float.*

Things would often be much pleasanter if this weren't so. In air conditioning today, for example, thousands of worthy folk whose only fault is ignorance (and gullibility) are paying out good money to "driftwood" contractors—paying for trash and junk, at best virtually useless, at worst actually dangerous—in the fond belief that they are buying home air conditioning.

And right around the corner from them the stick-in-the-muds—honest and conscientious but not very wide-awake architects, builders, heating contractors—are still angrily and drowsily muttering that there isn't such thing as practical home air conditioning; that if there is it won't work; that if it does work it costs too much; and even if it doesn't cost too much the public doesn't really want it.

But grumbling won't get us anywhere. This preachment is not addressed to the stick-in-the-muds—or to the driftwood. I am talking, I hope, to at least a reasonable number of architects and builders who are not only honest and conscientious but progressive; who are in general agreement with the two previous articles of this series, and actively interested in what to do next.

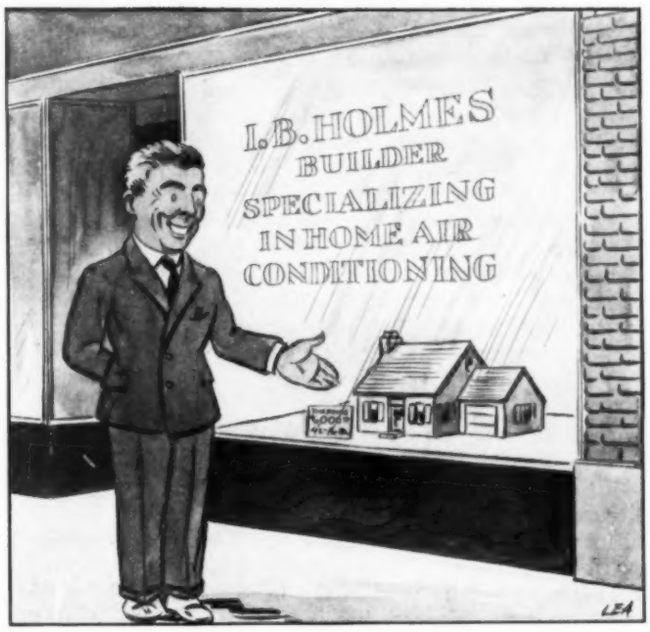
These men know that there is such a thing as practical home air conditioning; that it does work; that it doesn't cost too much; and that there are a good many million people in the United States who are going to want it—and want it so badly they'll find some way to get it; with your help if you provide it; without your help if you don't.

The question is: How can we each best find our own share of these millions of comfort-seeking American families, and how can we best help them, to our own honest profit?

There's no doubt whatever in my mind about the main answer to that question, at this particular present stage of the game. When you are trying to find somebody, you don't go on a still hunt—at least not if you're smart. You make as much noise as you can, hoping to attract his attention so that instead of your having to find *him*, he will find *you*. And the noise you make is called *advertising*.

I'm using that word, you understand, not merely in its narrow, conventional, everyday sense, but in its broadest, dictionary sense: advertising—making publicly known. We need to make publicly known, by every means in our power, starting with direct word of mouth, our own interest in home air conditioning, and our knowledge of its possibilities—as fast as we acquire any.

We even need to advertise home air conditioning, right now, to our own competitors. This market is so immense, and the number of individuals—whether in architectural practice, home construction, or any of the more special parts of the job—who are, today, adequately equipped with up-to-date knowledge and facilities to supply the demand that is going to break any minute now, is so small by comparison, that this is one stage where "the more the merrier" is the best motto.



In other words, you stand to benefit far more by the help of the stick-in-the-muds—if you can get them unstuck and actively moving with the tide—in educating the public, than you possibly could by freedom from their competition. None of us who are actively on the job are going to feel any real competition in the next few years; we're all going to have more than we can handle.

And above all, we need all the honest men we can get, in every phase of the job, to help us crowd out the driftwood and protect our customers, actual and prospective, from getting stuck with the kind of "gyp" merchandise that is being peddled actively right now under the name of "air conditioning," in your town—and yours, and yours, and yours.

Don't let us forget for one little minute that every sale of lath-and-plaster air-ducts, tin-kettle humidifiers, horse-blanket filters and junk-heap salvaged electric fans stuck into the return air duct with solder . . . kills off a customer for a real home air conditioning job.

And if you think my descriptive terms for the "equipment" (God save the mark!) that is being sold right now by some of these fast-moving, plausible gentlemen who used to sell Peruvian bonds, or big Injin oil stock, or speculative cemetery lots . . . are too picturesque, you just ought to hear some of the stories I've heard, or see some of the melancholy case histories that float across my desk!

Remember this, too: If the public (or that actually infinitesimal portion of it which you personally encounter, and from which, consequently, you draw your conclusions about millions of people you've never seen or heard of and never will) if your own particular public doesn't seem as yet to show much interest in home air conditioning, that is very largely due to ignorance and inability, as yet, to believe what we know to be so.

As I remarked last month, the evidence (such of it as I have been able to gather from my own tiny samplings) indicates that *(Continued on page 110)*

How to Save by Closer Figuring On the Home Heating Plant

By MONROE WORTHINGTON

RIGHT: Monroe Worthington, the author, is manager of Associated Building Contractors, Ltd. of Beckley, West Virginia.

SAVINGS approaching $50 and sometimes far greater can be made on almost any house by giving close attention to the heat. And the customer gets a more comfortable, easier heated house at the same time.

This is admittedly no new discovery, but Associated Building Contractors, Ltd. of Beckley, West Virginia, have found an easy way of putting old facts to work.

Too often in the past the general contractor has shifted all responsibility for heating to the plumber. It is fine to let the plumber do the work—but when responsibility of deciding just how big a heating system is to be installed is also shifted to the plumber, someone is likely to suffer.

Between the Devil and the Deep Blue Sea

Either the heating system will be far too large, if the plumber is conscientious but untrained, or it is likely to be inadequate to heat the house at all with any degree of comfort.

This may not be true in the larger cities, where educated and experienced heating engineers calculate the necessary size, but it is certainly true in the smaller population centers. Many of the plumbers, themselves, make no pretense of knowing how big a system is required. Instead, they ask the heating equipment salesman to figure out a bill of materials, and if the salesman's figures are accepted, the result is likely to be a plant that costs anywhere from $50 to $500 too much.

But how can a general contractor, already busy, be expected to qualify as an expert in a field where there are all too few experts?

The easy methods described in the balance of this article should not take more than half an hour for an entire house, and will be far more accurate than the "guesses" which control the installation of 99 per cent of the heating systems. While the methods here revealed are easy to use, they took months of calculation and simplification before they reached their present streamlined efficiency. They can be combined with "TruCost" calculations, and be made almost painless.

In the first place, there are only four things to figure, and the result is bound to be accurate.

Easy 1-2-3-4 Methods

The sample calculation which follows will illustrate the method, and then anyone can use the simplified tables which follow, either with or without knowing "why" they work.

Sample Problem:

Assume a 15′ x 15′ northwest room in a one story brick veneer house, with one 2′4″ x 4′10″ non-weatherstripped window on each of the two exterior walls. Ceilings have a nominal height of 8′6″, and the room is plastered. Below is a basement, where the temperature never goes below freezing. The room must be kept heated to 70 degrees when the outside temperature goes as low as 5 degrees below zero, Fahrenheit.

The heat losses are four in number, in this and all other houses:

1. Loss through air leakage, ventilation and/or infiltration.
2. Loss through walls.
3. Loss through floors, ceilings and/or roof.
4. Loss through window glass.

To determine the loss through air leakage and ventilation, or, as we will call it, infiltration, find the cubic feet of volume in the room, which is 1912.5 cubic feet. As it is a room with a two wall, northwest exposure, it is safe to assume that the air changes every forty minutes. In other words, 2870 cubic feet of air must be heated every hour. Multiply 2870 by 1.34 (correct constant for 5 degrees below zero country) and the answer is 3846 British thermal units, or btu's, per hour. Write it down, where you can add other figures to it, as they are calculated.

Now the heating engineer, in determining the loss through walls, will first determine the area of exposed walls, will then calculate the R (heat resistance) of the type of construction used, from that determine the U (or amount of heat which will pass through the wall) and then multiply that by the temperature differential. But when calculation has been done in advance, as here, you look at the attached construction table, which shows the final heat loss in btu's per lineal foot of exterior wall. Multiply 30 (feet of exterior wall) by 170 (correct constant for this type of construction in a 5 below zero climate) and the answer is 5100 btu's per hour. Ignore the windows in this calculation. The extra heat loss calculated will be an extra margin of safety.

Plenty of Safety in Method

To determine the heat loss to the heated basement is a refinement which is not often considered even by the engineers. Usually, they consider that there is no heat loss. And, in ordinary weather, with uninsulated heating pipes, there is none. But, by calculating it, there is an additional margin, and you can guarantee that your system will be large enough.

First, determine the number of square feet of floor and ceiling, which in each case here is 225 square feet, as the ceiling is entirely flat.

We will assume that the temperature in the basement never goes below freezing.

Multiplying 225 by the floor constant, 13.7, gives 3083 btu's.

Multiplying 225 by the ceiling-roof constant, 21.7, gives 4483 btu's.

To determine the heat loss through the windows, take the overall size, and find the area, which is 11.25 square

HEAT LOSS TABLES

(Based upon 70 degrees inside, and 5 degrees below zero outside)

INFILTRATION LOSS

1.34 btu's per cubic foot of air change per hour.

WALL CONDUCTION LOSS

(Expressed in btu's per lineal foot of exterior wall, per story, per hour)

1. 8" hollow clay or cinder tile, plastered direct with gypsum, 272 btu's.
2. 8" brick and tile wall, plastered direct, 264 btu's.
3. 8" brick and tile wall, plastered direct with expanded mica plaster, 192 btu's.
4. Drop siding, wood sheathing, building paper, gypsum plaster on rocklath, 172 btu's.
5. Brick veneer, wood sheathing, gypsum plaster or rocklath, 170 btu's.
6. Asbestos siding, ¾" insulating sheathing, no paper, gypsum plaster on rocklath, 162 btu's.
7. Drop siding, ¾" insulating sheathing, plaster on rocklath, 140 btu's.
8. Brick veneer, ¾" insulating sheathing, plaster on rocklath, 134 btu's.
9. Drop siding, ¾" insulating sheathing, 4" mineral wool, gypsum plaster on rocklath, 37 btu's.

FLOOR LOSS

(With basement at 32°)

Standard sub-floor, paper and oak finish floor, 13.7 btu's per square foot per hour.

CEILING AND ROOF LOSS

1. Gypsum plastered rocklath, air space, wood sheathing, asphalt shingles, 21.7 btu's per square foot per hour.
2. Same as above, but with 4" mineral wool, 5 btu's per square foot per hour.

WINDOW AND DOOR LOSS

(Calculate this as though the entire opening were of glass)

1. Single glass, 85 btu's per square foot per hour.
2. Double panes of glass (not "double strength" glass, which takes the first rating, if only one thickness or pane is used) 34 btu's per square foot per hour.

feet. Multiply by two (windows) and then by the constant 85, the answer being 1913 btu's.

Then add:

3846	btu's, air loss.
5100	btu's, wall loss.
3083	btu's, floor loss.
4483	btu's, ceiling loss.
1913	btu's, window loss.
18,425	btu's, total loss.

Now comes an opportunity for saving.

As almost everyone in the building business knows, a square foot of steam radiation is calculated as having a heat emission, or capacity, of 240 btu's per hour. So, by dividing the 18,425 btu's by 240, the answer is 77, or the number of square feet of steam radiator capacity which will be required to heat this one room.

Now the old "open" or atmospheric pressure hot water system, virtually obsolete today, had a capacity of only 150 btu's per square foot of radiation, as the water did not ordinarily get hotter than 180 degrees. The closed system, which can be operated under a pressure of perhaps 10 pounds to the square inch, and temperatures approaching 240 degrees, will put out as much heat per square foot as will the radiator when operated with steam. But most plumbers still use the 150 btu figure which would give, by division, 123 feet of radiation—a difference of 56 feet of radiation, in one room alone. With radiation installation costs approaching $1.50 a foot, and virtually never under $1.05 a foot, the importance of proper calculation, specification and installation immediately becomes apparent.

But there are even greater opportunities for saving, opportunities which will benefit the customer, in operating costs, as well as the general contractor in installation.

Inspection of the attached table shows that if the exterior of this house were covered with a 3-4 inch rigid sheathing, instead of wood storm siding and building paper, the saving in heat from wall radiation would be 900 btu's per hour—the equivalent of 3¾ feet of radiation.

Use of 2 inches of mineral wool in the outside wall would mean a saving of 13½ feet of radiation.

Use of 4 inches of mineral wool over the ceiling, or under the roof, would mean a saving of 15.6 feet of radiation for this room.

The greatest opportunities for profit, however, lie in the use of storm windows, as the following analysis, taken from the above calculations and the heat emission table, will show.

In the first place, it is safe to assume that good storm windows will cut the infiltration, or wind loss, in two, thus eliminating heat losses of 1923 btu's, or approximately 8 feet of steam radiation. This, in itself, will often more than pay for the storm windows.

Then the conduction losses through the window are cut, as the table shows, from 85 to 33.75 btu's, per square foot of window—a total saving of 1154 btu's, or approximately 4.5 more feet of radiation.

The Net Coal Saving

Elimination, justified elimination of each foot of radiation will save three-fourths of a pound of coal per day. In other words, if a well insulated house cuts the heating load by the equivalent of 225 feet of radiation, in a city like Chicago, during an average cold year, the total coal saved is 14,152 pounds—a little more than seven tons, assuming use of a low volatile coal (such as New River or Pocahontas coal), burnt with 64 percent efficiency, which is good. With inferior coals, or lessened efficiency, the tonnage saving would be much greater.

Equivalent savings would be made with oil or gas.

Do not make the mistake of assuming that the total radiator capacity is the proper size for the furnace. This is not true. The boiler is always larger.

To the intentional heat dissipation, through radiators, is added loss through the pipes. In a small house, these pipes keep the floor warm, and insulation might not be justified. When the pipes are exposed, radiators are ordinarily not required in the basement. It is hard to lay down any hard and fast rules for computing this loss, but since excess boiler capacity is relatively inexpensive, over-liberality is not greatly penalized.

Then the size of the boiler is generally increased, by up to 50 percent, to care for the "pick-up" load; in other words, to heat the house quickly, when there has been no fire.

An important addition to boiler capacity is the allowance to be made for water heating, if one of the "Taco" or other integral type water heaters are used. For each gallon of maximum demand per hour, assuming that the water temperature is raised 100 degrees, add 3.5 feet of steam radiation to the boiler capacity.

When it is considered that good planning and modern construction can effect the savings listed above, sometimes with actual saving to the contractor as well as to the future owner of the home, the importance of careful attention to heat becomes apparent.

THE WELL LIGHTED INTERIOR is the window display of this Portland, Ore., store. Front is Micarta and Carrara glass, aluminum trimmed.

Store Designed with Displayless Windows

THE trend toward displayless store windows in which Sprouse-Reitz Co., operators of 145 western variety stores, are leaders, is now being seriously considered by operators of this type of chain in other sections of the country. All new Sprouse-Reitz stores are of the displayless window type, and practically all their old stores have been remodeled into such designs.

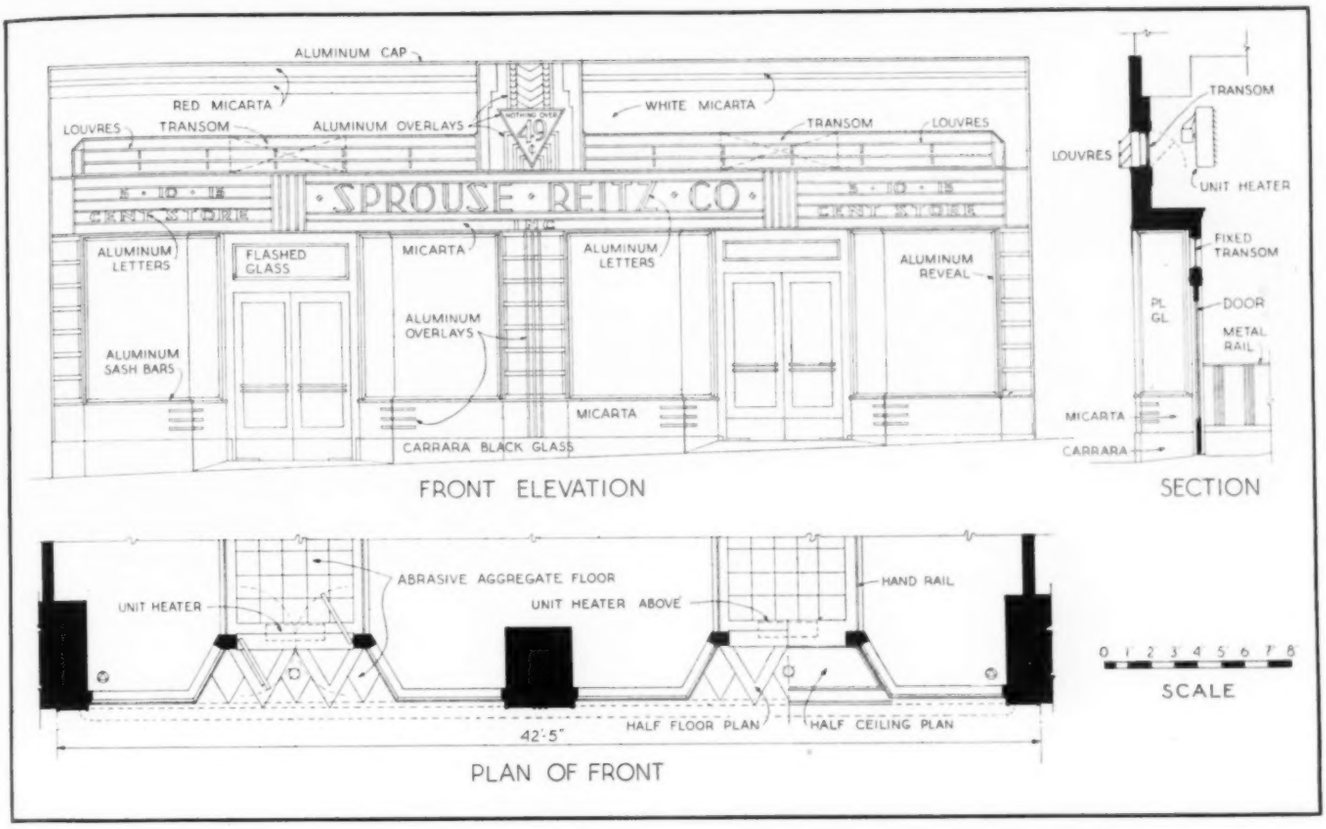
One hundred per cent visibility into the interior is obtained in these new designs where the usual type of window is substituted by open glass fronts. Chinese red glazed tile with aluminum trim is now the standardized exterior finish. Many units, such as the one above, have been finished with Micarta and Carrara glass over cement plaster. Store fronts are mostly of frame construction with cement plaster or masonry over metal lath. Windows are mounted in alumilite, and double-acting doors have LCN hinges.

Conventional window lighting is eliminated and more brilliant lighting given interiors which have 38 candle lighting intensity throughout. Pendant type, semi-indirect fixtures are used with 300 watt lamps, and displays at the front of the store are spotlighted with floodlights at each corner.

Except in very sunny localities, Venetian blinds finished with aluminum paint serve as awnings.

Existing structural columns throughout the store are

NEON directional signs suspended from individual transformers add to the brilliant lighting effect as seen from the street. Plain plaster walls and ceiling painted in light tones add to the apparent spaciousness.



furred out to square designs which are most advantageous for display purposes. The supporting column along the window line in the larger Portland store shown on these pages is used as a support for adjustable metal shelf fixtures which extend to the floor on each side. These are equipped with plate glass shelves.

Selling counters and fixtures extend to within eight feet of the front of the store. Display cases built into the lower parts of the front ends of the cases result in a continuous line of illuminated floor displays across the front of the store. These cases are lined with flat white paint, which sets off all classes of merchandise to best advantage. Additional selling counters, with display cases beneath, are built directly behind the supporting column of the windows.

Interior color scheme is carried out in Chinese red and silver. Counters are finished with aluminum paint and trimmed with wide fluted mouldings painted red. Backgrounds for plate glass shelvings at the front of the store are painted aluminum and trimmed with wide red moulding at top and bottom.

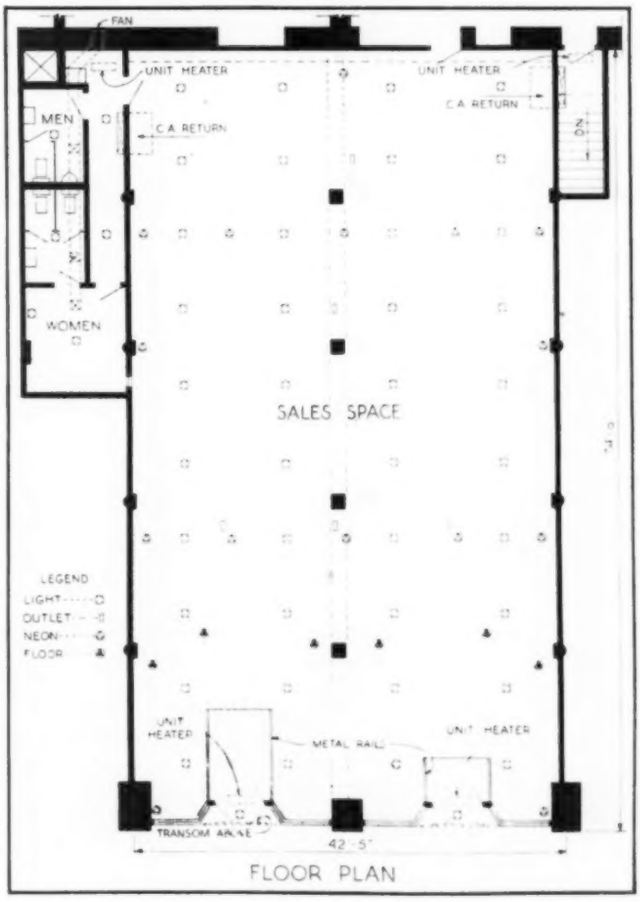
Slight modification of the complete displayless window has been made in recent experiments where a 21-inch deep "cradle" display, raised 20 inches from the ground and enclosed at the back with a 21-inch high solid rail, now permits small displays of single items of merchandise. Increased sales of the featured items are the result.

Due to the fact that customers who shop at these stores have their backs turned to the clerks, shoplifting has been almost entirely eliminated.

Two Modine steam unit heaters, which are installed over the two entrances to the store, are equipped with suction fans for intake of fresh air through grilles across the front of the exterior. These heaters are supplied with steam from the outside through city-wide service of the Northwest Electric Co.

Lawrence, Holford & Allyn, Portland, Ore., were the architects; Allen V. Moore was the contractor.

ABOVE: Elevation, plan and section of store front indicate construction details. Modine unit heaters over entrances are supplied with steam from a city-wide service. In the store floor plan below, location of electric outlets for lighting of the counters and row of self-service selling shelves around the walls is shown with symbols.

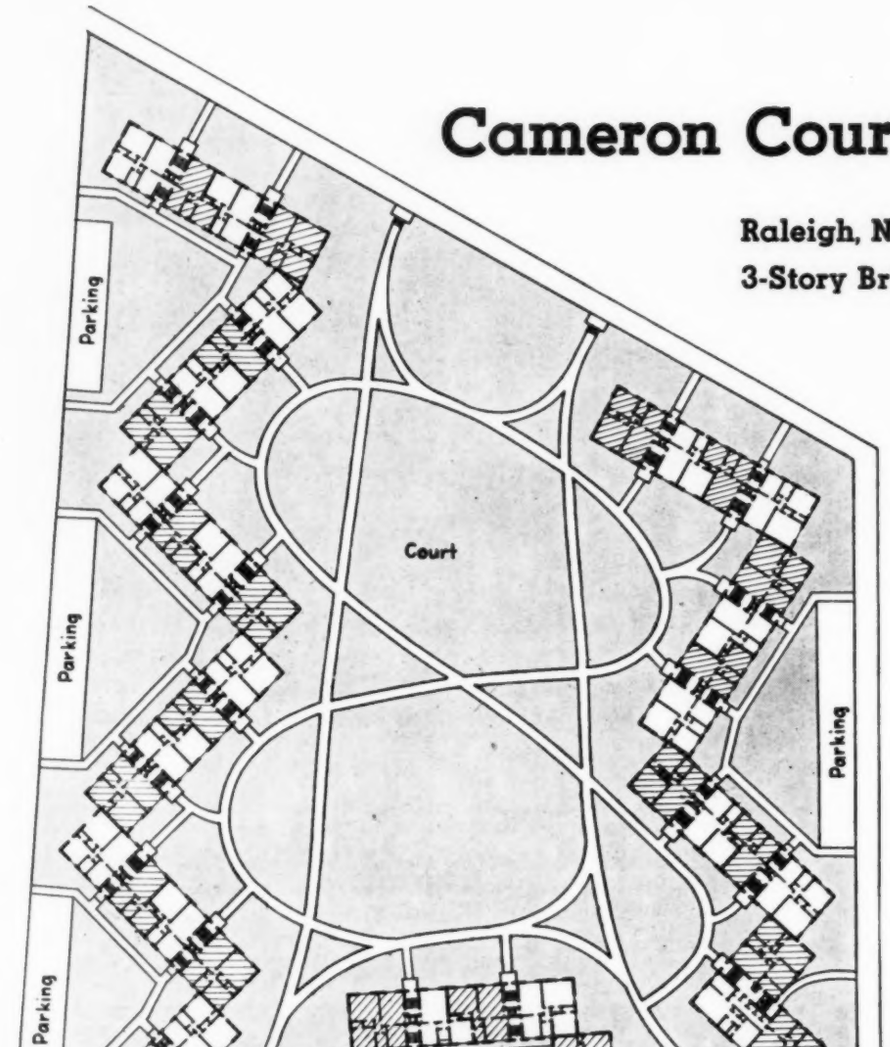


Cameron Court Apartments

Raleigh, N. C. Builder Erects Modern, 3-Story Brick Apartments Under FHA

Goode Construction Corp., Builders

H. A. Underwood Co., Architects



PLOT PLAN of Cameron Court apartments, Raleigh, N. C., showing arrangement of units around wooded court.

TYPICAL KITCHEN equipped with electric range, refrigerator, metal cabinets.

ONE of the evidences of prosperous conditions in North Carolina is the growing volume of residential construction of all types recorded there in recent years. In Raleigh, a city of approximately 40,000 and capital of the state, there have been built two large rental housing projects in the past year. These are three-story masonry structures located on large wooded plots and grouped around attractive open courts that provide an ideal setting.

Both projects have been very successful and were fully rented shortly after completion.

Cameron Court apartments, illustrated with this article, were built by the Goode Construction Corporation of Charlotte, from plans by H. A. Underwood Company, architects and engineers of Raleigh. There are three major buildings consisting of 13 groups of apartments, having a total of 147 three, four and five-room units. The exterior is of red brick with a dignified Southern Colonial trim.

The buildings are grouped about a large, attractively landscaped court as indicated in the plot plan above. They are simple, rectangular structures, economical to build. In most cases the apartment units extend through the width of the building so that there is excellent cross ventilation. The units are separated by solid masonry walls. The individual three, four and five-room apartment units are well laid out, with large steel casement windows which swing out, well proportioned rooms, private service door and stairs at rear.

Kitchens are equipped with General Electric ranges, refrigerators, sinks and cabinets. Kitchens were scientifically laid out, making use of standard kitchen units and providing compact, efficient arrangement that saves steps. There is an unusual amount of storage for a moderate rental apartment.

Cameron Court buildings are heated from a central plant which employs automatic stokers with electric pumps to force steam out and return condensation. Sep-

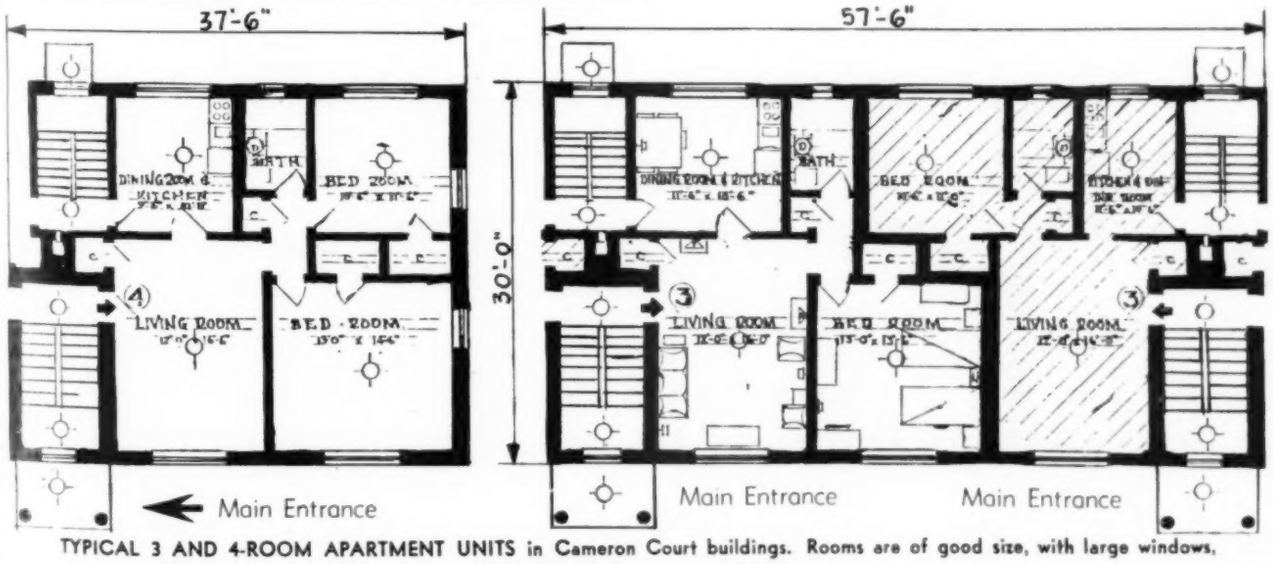
COLONIAL ENTRANCE, red brick exterior, steel casements.

AERIAL VIEW of Cameron Court apartments, showing how 147 units are grouped about court.

arate steel lockers are provided in the basement for every apartment, providing ample storage space. A servant's lavatory is provided for each six apartments. Each apartment unit has its own front and rear entrance.

There is some feeling among local residential builders and dealers that the two large rental projects may have an adverse effect on single-family home building. For a town of 40,000 the volume of single-family home building has been active, and better than most comparable cities in other parts of the country. Because Raleigh is the capital of the state and has a considerable transient population, there is possibly more justification for rental housing than in some other communities. The average monthly cost to the renter in Cameron Court apartments is $14.69 per room, which, by any standard, is not "low cost." It is pointed out that at such rentals it is possible for an individual to buy and own a new single-family home at less cost, and it is considered by some observers that the fact that persons are willing to pay such rents rather than live in a home of their own is a reflection on the merchandising and selling methods of the local residential builders.

TYPICAL 5-ROOM APARTMENT floor plan located in buildings G-J-K. There are large windows. Living room is 11' 6" x 16' 6"; bath is located off convenient center hall. Kitchen has rear service door and stairs.



TYPICAL 3 AND 4-ROOM APARTMENT UNITS in Cameron Court buildings. Rooms are of good size, with large windows, cross ventilation, good closet space. H. A. Underwood Company, architects.

How to Estimate Accurately

Windows and Door Frames Are Considered in This Article of a Series on Estimating

By J. DOUGLAS WILSON
Head, Building Trades Dept., Wiggins Trade School, Los Angeles, Calif.

AFTER a house is framed there is considerable work to be done closing in the frame and the openings. This work varies according to the kind of finish the exterior walls are to have.

The estimating work is divided into four units as follows: window and door frames; walls; cornice; and roofing. Each unit includes several kinds of materials.

Mill Made Frames

A window or door frame is a completed unit, constructed of finish material into which a window or exterior door is fitted and hung. Frames may be purchased from a mill or the carpenter sometimes constructs frames on the job.

The frames are "set" at varying stages of erection, depending upon the exterior construction. For a plastered exterior, they are set before the outside lathing is done. In the West frames are set after the siding is on; in the East, they are set after the storm sheathing is on, but before the finish siding is fitted and nailed.

To list a group of window or door frames requires many items of information be given as follows:

Number of Frames: This means the quantity of frames required, and only those frames that are alike in every detail may be grouped.

Name of Frame: The name is derived from the kind of window or door sash fitted into the frame. The common types are:

a. Double hung window, slides vertically.
b. Casement window, swings in or out.
c. Stationary window, does not open.
d. Door, opens in or out.

For any type of frame that has two or more openings, the sash can be double hung, casement, stationary or a combination of any of these three. When a frame is constructed to take care of two separate windows, it is known as a mullion frame (see figure 1); if for three windows it is called a triplet frame. (See figure 2.) The term mullion is also applied to the vertical bar that separates a frame into two or more parts.

Size of Frame: The dimensions of a frame are listed the same as the size of the window, sash or doors for which the frame is made. The width is given first and then the length. To illustrate: A frame for a 2′-0″ x 3′-0″ window would be ordered: one double hung window frame 2′-0″ x 3′-0″. To order a triplet frame the procedure varies slightly. For example: The plans show two casement sash 2′-0″ x 4′-6″ and one stationary sash 4′-0″ x 4′-6″ to go into one frame. The order would be listed as one $\frac{2'\text{-}0'' \times 4'\text{-}0'' \times 2'\text{-}0''}{4'\text{-}6''}$ triplet window frame.

The expression $\frac{2'\text{-}0'' \times 4'\text{-}0'' \times 2'\text{-}0''}{4'\text{-}6''}$ means that the outside windows are 2′-0″ wide; the center sash 4′0″ wide and all are 4′-6″ long. (See figure 2.)

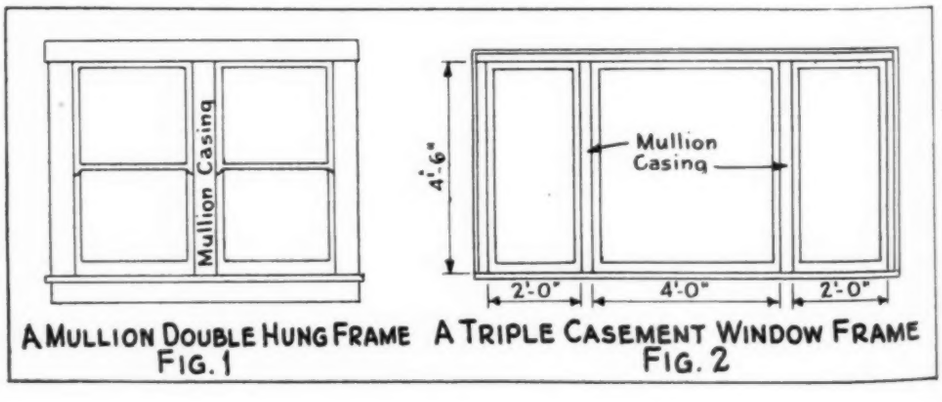
Thickness of the Jamb: The thickness of the jamb stock will vary from 1″ to 2″. The details on the blueprint or the specifications will give this information.

Width of the Jamb or Pulley Stile Stock: This measurement is very important as a frame is usually set in place before the inside wall is plastered and must project beyond the face of the studding to provide the correct thickness for interior plaster. The thickness of the exterior finish must be figured likewise. The exact width of the jamb stock is based on an architect's detail. Sometimes it may be determined by adding the thickness of the outside finish, the width of the wall studs, and the thickness desired for finish material on the inside face of the wall. Figure 3 indicates the relation of these parts.

Kind of Lumber Used for Jamb: This will vary according to the specifications for the building and the location of a frame in a building. Douglas fir and cypress are often used for this purpose.

Construction of the Casement Jamb or Pulley Stile: There are two ways of making a jamb for a door or casement frame as shown in figure 4. (A) The stop is nailed on; or (B) the jamb is made of a thick piece of stock and rabbetted to suit the thickness of the sash or door. An outside door jamb is similar to a casement window jamb except for sizes or rabbett and the kind of lumber used for the sill.

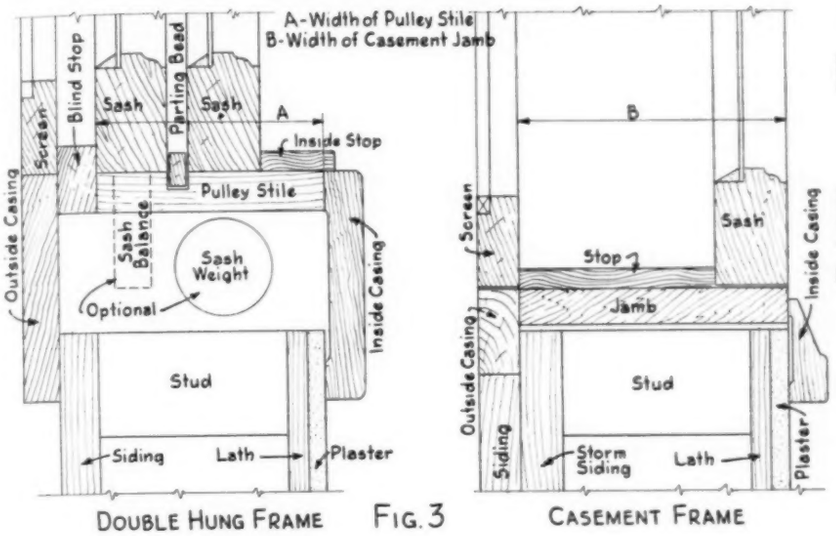
The jamb for a double hung window frame is called a pulley stile, see figure 3, and requires a piece of blind stop and parting bead to complete it. The blind stop gets its name from the fact it provides a stop for the outside blind or shutter. If a blind is not used, it serves the same purpose for the window screen. The parting bead serves as a guide and separates or parts the upper and lower vertical sliding sash.



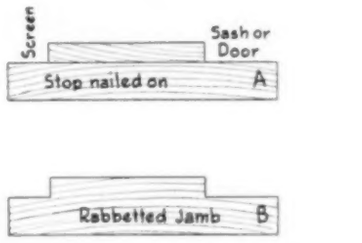
A MULLION DOUBLE HUNG FRAME FIG. 1

A TRIPLE CASEMENT WINDOW FRAME FIG. 2

RIGHT: Figures 1 and 2 show difference between a mullion double-hung and a triple casement frame.



DOUBLE HUNG FRAME FIG. 3 CASEMENT FRAME



TWO METHODS OF MAKING A CASEMENT WINDOW OR DOOR JAMB
FIG. 4

FIGURE 3 gives details of framing for double-hung and casement windows. Figure 4: Two methods of making window or door jamb.

Thickness of the Sash or Door: This measurement is very important, as the jamb for a frame cannot be milled until this is known. If a double hung frame, the pulley stile must be grooved to fit the thickness of the window. For a casement sash or door the jamb must be rabbetted the same as the thickness of the sash or door.

Which Way the Casement Sash or Door Opens: A casement sash, or outside door, may open in or out and the correct information must be stated on the order.

Size of Outside Casings: This measurement is given on the plans or in the specifications.

Kind of Lumber for Outside Casings: Redwood is often used for this purpose due to its weather resisting qualities. However, specifications should be consulted.

Size of the Sill: The size of the sill is shown on the detail sheet or will be given in the specifications.

Kind of Lumber for Sill: Redwood is generally used for window sills. Door frame sills are usually vertical grained Douglas fir or oak. This information is given in the specifications.

Shape of Sill: The plans will usually have a detail of the sill for a frame. If none is given, the mill will use a standard pattern.

Width of the Mullion Casing: A mullion casing is the vertical casing between any two sash fastened in the same window frame, as shown in figure 1. It is not always the same width for every frame on a job. The detail sheet will usually give the width of the mullion. The kind of lumber is the same as the outside casing (see above).

Window and Door Frame Material

On many jobs window and door frames are made by the carpenter. It is then necessary to estimate the different materials needed such as jambs, pulley stiles, outside casings, band moulding, blind stop, parting bead and sills. (See figure 3.)

The two side jambs and the top piece (head) of a frame are the same shape and kind of material. The sill is always a different shape and size than the size and head jambs.

The frame size is the same as the door or window for which it is made, hence these sizes are used as the basis for figuring lengths of stock needed to make a frame.

Material for mullion jambs is often the same size and shape as the stock used for the balance of the frame. If the specifications or detail drawings indicate a different shaped piece a separate list of material must be made.

Casement Window Jambs: A casement jamb is that part of a casement window frame into which the sash is fitted and hung. The vertical pieces are known as side jambs; the horizontal piece at the top of the frame is called the head jamb. The sill at the bottom of the frame is not the same shaped material.

The width of jamb stock will depend on the width of the studs and the thickness of the finish on each face of the wall. Blueprints will usually give exact details and specifications will state the thickness of the lumber.

Rule: To find the length of a casement jamb, multiply the length of the window by two; add the width of the window; allow 12″ more for joints; then increase to the next even foot length of stock. One piece of jamb stock is required for each casement window.

If the frame is a mullion or triplet figure each opening separately.

NOTE: There are two ways of constructing a mullion or triplet frame. One way is to construct the frame with a continuous head jamb, the mullion side jambs being "gained" into it. The second method is to construct the frame by making each opening in it a separate one, this method requiring two side jambs and one head jamb for each window. The sill is always continuous for all mullion and triplet frames. (See figure 5.) The window jamb rule given above applies to the second situation.

(Continued on page 90)

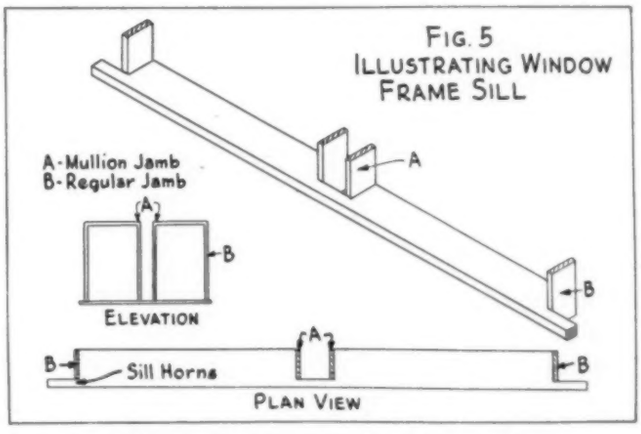


FIG. 5
ILLUSTRATING WINDOW FRAME SILL

FIGURE 5: Continuous sill for mullion windows.

News of the Month

Building Activities and Meetings

FHA Announces New 5% Down Payment Plan on Homes $2,500 and Under

THE Federal Housing Administration has announced a plan for financing construction of small homes which will require the purchaser to make only a 5 per cent "down payment" on a house costing no more than $2,500.

Stewart McDonald, Federal Housing Administrator, said regulations making the program effective Sept. 1 had been mailed to banks and other lending institutions. The FHA does not lend money itself, but insures construction loans made by private institutions.

The new plan will be limited to homes costing $2,500 or less, and will not affect the present FHA program of financing costlier homes on a basis of a 10 per cent minimum down payment and a 4½ per cent mortgage, plus a ½ per cent insurance premium.

Monthly payments on a home valued at $2,000, the FHA said, would be a little less than $17 a month, not including taxes and fire insurance.

Residential Building Shows Seasonal Upturn; 1939 Improvement Continues

FIGURES for the first 22 days of August show that residential building amounted to $83,490,000, according to the F. W. Dodge Corporation. This compares with $61,338,000 for the same period last year, representing an increase of about 28 per cent.

The statistics for the four classes of construction, as recorded during July, are as follows:

37 Eastern States	July, 1939	July, 1938	Aug. 1-22, '39
Residential	$109,330,000	$ 87,978,000	$ 83,490,000
Non-Residential	88,501,000	72,563,000	49,035,000
Public Works	78,960,000	65,827,000	77,442,000
Utilities	23,092,000	13,431,000	14,246,000
Total	$299,883,000	$239,799,000	$224,213,000

"Fear of Unemployment" Given as Principal Reason for Not Building Homes

THE Mortgage Bankers Association of America, which has recently polled its members to determine what they believe are the actual reasons why new construction has not developed more rapidly than it has, states that "uncertainty over continued employment" is the principal reason why more people do not build their own homes. This problem and how it can be solved, S. M. Waters, president, said, will be one of the principal topics for discussion at the Association's 26th annual convention in Detroit October 4-6. The study was made among the Association's members in 65 representative cities.

Ninety-seven per cent of the replying members cite "fear of holding their jobs" as the primary reason why people are afraid to embark on home ownership, and a large majority of them cite it as the "most important reason by far." Next in importance is the "high cost of labor and materials" with 74 per cent citing it as a deterrent to more new building. But, on this point, there was a far from uniform opinion. Of the 26 per cent of the members replying who do not hold labor and material costs too high, many declared they felt that this factor has been "highly over-exaggerated" and some even declared they did "not wish to see building costs reduced."

Of the 74 per cent who think labor and material costs too high, an important number view this factor as one "that will take care of itself and become adjusted"; it is by no means the most serious.

Decentralization to Be Discussed at Real Estate Convention in Los Angeles

THE decentralization movement now going on in many an American city and the influence it has upon the value of real estate, central and suburban, is becoming so important a factor that it will be a major topic of discussion at the coming annual convention of the National Association of Real Estate Boards, which meets at the Biltmore Hotel, Los Angeles, October 24, 25, 26, and 27. From several approaches the convention will be concerned with means that may be taken to adjust our present urban plant more comfortably to our modern ways of living and to bring about the adjustment in ways to conserve urban real estate values.

In the meantime, the American Institute of Real Estate Appraisers, professional branch of the Association in the valuation field, has scheduled on its program at the convention a very specific discussion of the influence of urban decentralization on central business values.

David Neiswanger, M.A.I., Topeka, Kans., chairman of the Institute's committee on education, past vice president of the Association and past president of the Kansas Association of Real Estate Boards, will address the Institute on this subject. George H. Coffin, Jr., M.A.I., Hollywood, Calif., will lead the subsequent discussion.

Boyd T. Barnard, M.A.I., general partner, Jackson-Cross Company, Philadelphia, will review basic principles and procedures of valuation with special reference to trends affecting the outlook for the house that is five, ten, fifteen, or more years old.

Andersen Adopts "Income Security Plan"

A NEW employee income stabilization plan which may become the model for hundreds of American industries now searching for some way to solve this important problem has been announced by Fred C. Andersen, president of Andersen Corporation of Bayport, Minn., one of America's largest manufacturers of wood window frames and factory-fitted wood window units. The plan covers the 432 employees of the Andersen Foundry Company as well as of the Andersen Corporation.

Instead of following the guaranteed minimum weekly pay check plan with adjusted compensation at the end of the year, now operating at the Nunn-Bush Shoe Company, and George A. Hormel Company, meat packers, the Andersen "Income Security Plan" provides that employees fill out lean pay checks during slack production periods with non-interest bearing loans to be repaid from fatter pay checks during rush periods of this seasonal manufacturing business. Under the Andersen Income Security Plan, the employee provides himself with a minimum weekly income by drawing on his pay for future labor.

The Andersen Corporation defines income as meaning all wages drawn from the company plus all pay from any other employment plus unemployment insurance benefits. In announcing the plan, Mr. Andersen pointed out that the company had experimented with the plan in 1931 when work weeks were short, and pay checks were small. At that time the Andersen Corporation made it possible for employees having dependents to draw a sum equal to a total of 50 hours work per pay period, regardless of the number of hours worked. The difference between the 50 hours pay drawn and the actual amount earned was charged to the employee as a non-interest bearing loan, and was repaid in installments when the employee worked over 50 hours per pay period.

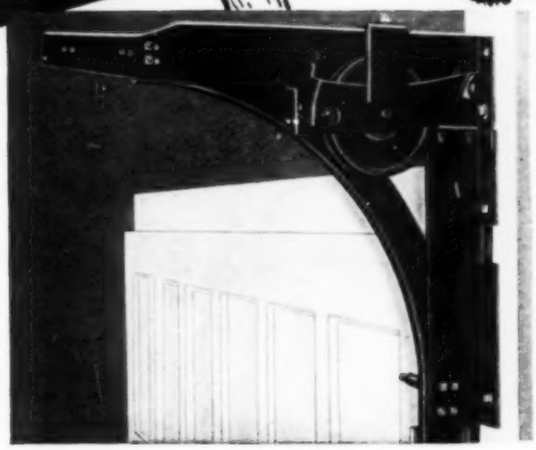
Hoo-Hoo Birthplace Signs Installed

THE birthplace of the Concatenated Order of Hoo-Hoo, the Fraternal Order of Lumbermen, at Gurdon, Ark., is now called to the attention of tourists entering that city on U. S. Highway No. 67 and State Highway No. 53 by highway signs installed through the co-operation of the Order of Hoo-Hoo, the Board of Trade and the Highway Department.

Hoo-Hoo had its inception at Gurdon, Ark., in January, 1892, and for the past several years a monument carrying the plaque announcing this event has stood in their Central Park. A few years ago floodlights were placed at the foot of this monument and within the last ten days highway markers have been installed.

A REVOLUTIONARY IDEA IN CURVED TRACK ASSEMBLY FOR **OVERHEAD** TYPE GARAGE DOORS!

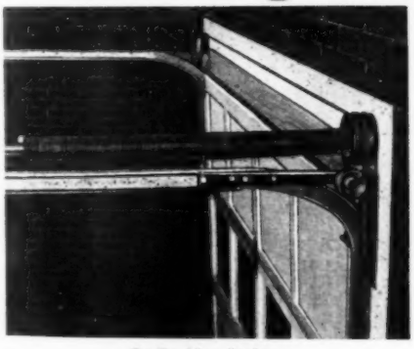
"CROW'S FOOT"



An Exclusive RO-WAY Feature

Note in the illustration at right how the outer bearing of the Ro-Way Sheave Wheel gets "three-point support." That's the "Crow's Foot." This new and patented improvement gives extra strength to the entire Load Sheave Bracket. You not only find this new "Crow's Foot" curved track assembly gives added strength and saves time in installation, but, in use, it gives greater freedom from mechanical troubles and makes Ro-Way Overhead Type Doors operate *more smoothly* and *more quietly.*

That's Just ONE Reason Why Today "The Big Swing is to Rō-WAY Doors"



Ro-To Live Spring.
No side-drift . . . no binding.

Ro-Way Hardware is made rust-resisting by "Parkerizing and Painting."

[Ro-Way Improved Overhead Type of Doors are available for every purpose . . . residential . . . commercial . . . industrial.]

—*Here are Two More:*

Rō-Tō *Live* Spring Last year, Ro-Way introduced in Model "J," a sensational improvement . . . "Ro-To Live Spring." It gives real floating power stored in a single spring when the door is closed, and released when the door is opened. Exactly the same lifting power is applied to the two sides of the door at exactly the same time. All side-drift and binding is ended.

"Parkerized and Painted" Hardware

Ro-Way now offers you the same rust-resisting treatment used by all leading motor car manufacturers. We Parkerize and Paint the hardware. So efficient is this method that Ro-Way parts power-pelted for 500 hours by fine salt spray showed no serious damage. We shall be glad to send you folder with full details of this remarkable test.

Get These Exclusive Features at No Extra Cost

In the past few years, there have been many important advances in the engineering, design and construction of Overhead Type of Doors. Ro-Way has set the pace. Before you buy any Garage Door, see what Ro-Way offers. See how much these improvements mean to you in better service, without extra cost.

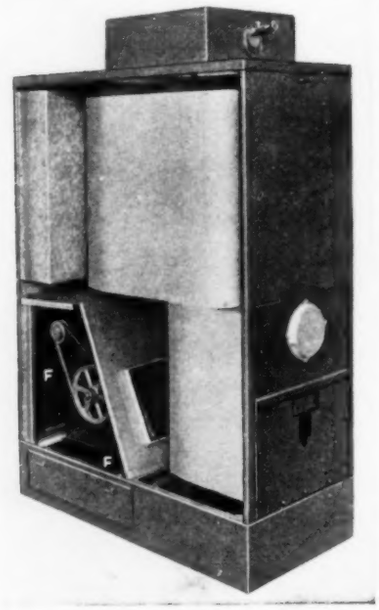
Write today for Ro-Way Door Folder and Price List

ROWE MANUFACTURING CO.
787 Holton St. Galesburg, Ill., U.S.A.

Improved Products for Better Building

Low Cost Home Oil-Fired Conditioner

THE Henry Furnace & Foundry Company of Cleveland, Ohio, has announced a new oil-fired winter air conditioner, designed particularly to fit the utility room of low-cost houses. This Series 55 "Utility" unit is made in one size only, developing 55,000 B.t.u.'s, adequate to offset the heat losses of the average small home. It includes the elements to perform all the functions of winter air conditioning efficiently and reliably, and is compact, occupying a floor space of 21 x 41 inches; the welded steel heating unit presents 4,800 square inches of heating surface. Vertical flues in the upper section add to the radiating surface. The blower forces air over the heated surfaces at comparatively high velocities, making this an efficient small unit at a reasonable cost for a complete packaged winter air conditioner. The unit is supplied without burner, and it operates with high efficiency with any standard pot-type or rotary-type burner.

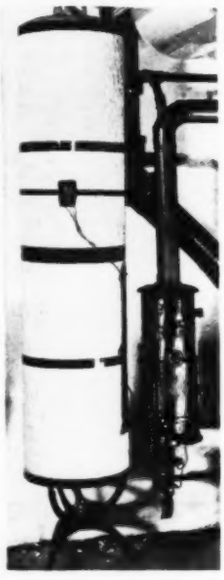


COMPACT oil-fired conditioner fits utility rooms of low-cost homes.

Electric Operator for Gas Water Heater

A SIMPLE accessory, manufactured by Savutime Devices, Inc., Rochester, N.Y., allows the lighting of any standard coil type gas hot water heater from any of three stations throughout the house by the press of a button. This same device also either turns off the heater automatically when a set temperature, thermostatically controlled, is reached, or may be turned off sooner by pressing a second button at any of the stations without going to the basement if only a small amount of water is wanted.

Red lights on wall switch plates located in the kitchen and bath signal when the heater is on and serve as a reminder for saving on gas. The device operates from regular house current with all wiring in the upstairs rooms carefully concealed. No new plumbing is required and the simplicity of the mechanism assures trouble-free operation.



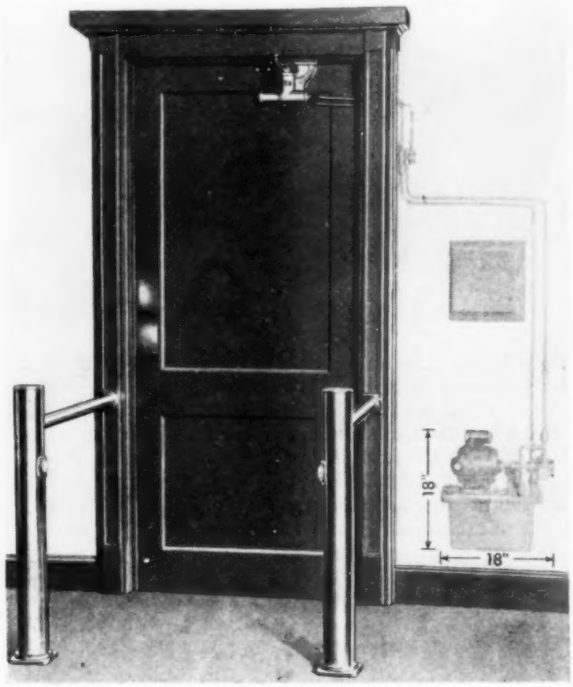
SAVUTIME installed on tank heater.

New Automatic Door Opener

THE "Phantom Doorman" is the appropriate name given to the new automatic door opener and closer developed by The Yale and Towne Manufacturing Company of Stamford, Conn. This device is designed for automatic control of hinged doors. It has many applications in industrial plants, hotels, restaurants, office buildings, apartment buildings, department stores, retail shops, terminals, schools, hospitals and other places.

The Yale door closer, visible or concealed, is equipped with electric hydraulic controls which make it an automatic door opener as well as a closer, operated either by electric-eye or switch control, or a combination of these to meet individual requirements. Outstanding advantages attributed to "The Phantom Doorman" are simplicity of construction, efficiency and durability.

To open the door hydraulic pressure, supplied by a concealed pump driven by an electric motor, is applied directly to move the piston and connecting pinion shaft and door closer arm. The pressure is then relieved and the door closer spring closes the door in the regular manner. There is no sudden pressure or stopping and, therefore, no shock.



THE "Phantom Doorman" automatically opens and closes door.

Portable Generator Allows Savings from Electric Tools Without Utility Lines

WHILE many contractors and builders appreciate and know the value of portable electric tools such as saws, electric drills and electric hammers in construction work, they hesitate to buy because of the problem of sometimes getting electricity at the job for operation of such tools.

Progressive contractors and builders, large and small operators alike, are quickly learning the value of portable generating units and many hundreds of these units have been purchased within recent months for use in the construction field. The portable generator that has sufficient electrical output to operate an electric hand saw of the size capable of doing 95 per cent of the cutting on any

(Continued to page 86)

RIGHT: Carrying both Homelite portable electric generator and Skilsaw to show ease of moving.

-and CERTAIN-TEED IS HELPING YOU MAKE IT A REAL "FALL ROUND-UP" OF BUSINESS

Labor Day to Thanksgiving 1939 is your opportunity for the biggest Fall remodeling business in years. Home owners are interested. Money is plentiful through liberal FHA Insured Loans. Certain-teed advertising has been expanded and extended to help you get business this Fall!

Climaxing this Certain-teed program is a smashing full-page advertisement devoted exclusively to remodeling in the October issue (out September 28th) of BETTER HOMES AND GARDENS. Reaching 1,833,648 home owners, it will be read by the most active and worthwhile prospects in your community.

Certain-teed Products—colorful, long-lived, fire-safe Mineral Surfaced Shingles; C-S-I, Certain-teed Structural Insulation, that builds as it insulates and decorates; Bestwall, the original Gypsum Wallboard, with improved Reinforcing Joint Systems, for concealed joints — have the sales appeal it takes to get the business. All Certain-teed products are time savers on the job. They help you get more jobs closed-in before snow flies.

For the latest information on modern Certain-teed Quality Building Products for new working and remodeling, use the coupon today.

Certain-teed

REGISTERED U.S. PAT. OFF.

QUALITY MADE *Certain*
SATISFACTION GUARAN-*teed*

CERTAIN-TEED PRODUCTS CORPORATION - GENERAL OFFICES, NEW YORK, N. Y.

CERTAIN-TEED PRODUCTS CORP. G5
100 East 42nd Street, New York, N. Y.

Gentlemen: Without obligation, send me literature on the subjects checked below:

ROOFING ☐ INSULATION ☐ BESTWALL ☐

*Name*_____

*Address*_____ *City*_____ *State*_____

Improved Products

(Continued from page 84)

construction job is light and compact. It can be taken anywhere on the job, for, as illustrated, one man can carry both the generator and a portable saw.

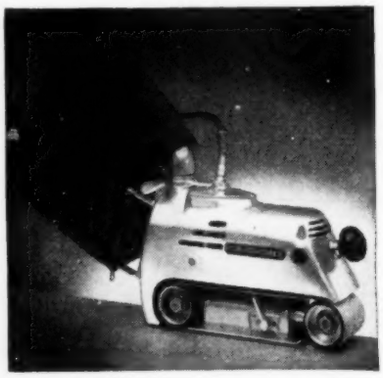
Gasoline, with a small amount of oil, is the only fuel needed for it, saving immediate cost of installation of electricity. This cost for temporary installation varies from $8 to $22 in various sections around the country. Also the portable generator makes possible building operations at reduced cost in communities or in sections where electricity is not available at all.

Electric Hand Sander

SEVERAL features necessary for greater production and super finish are incorporated in the latest model "Take-About" electric hand sander announced by Porter-Cable Machine Company, Syracuse, N.Y. It operates at a higher belt speed, and has more power. It is balanced four ways, is easier to handle and to obtain a true finished surface; it avoids spoilage.

The dust collecting system of the new model BB-10 Take-About is more effective; a double fan and ample power are provided. The BB-10 is practically dustless. Ventilating has been improved to obtain a cool operating unit.

Belt change is expedited by the new lever control. Correct tension on the belt at the new high speed is maintained automatically in this new model. A silent chain drive delivers more power to the point of work and provides a quiet running machine.

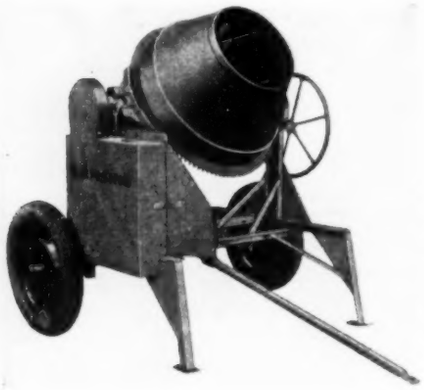


PORTABLE sander can be equipped for use on a variety of materials such as wood, metal, stone, glass, plastics, etc.

New 3½-S End Discharge Mixer

A NEW 3½ end discharge trailer mixer has been developed by the Lansing Company, Lansing, Mich. Its lightness and proper balance and design make for better high speed trailing and easy, quick placing on the job. The new principle of end discharge permits greater efficiency in loading concrete barrows, as well as a lower discharge height which is only 27 inches.

Equipped with an air-cooled engine, which eliminates the winter freezing problem, mounted in an enclosed housing, the new Lansing 3½ E.D. is extremely compact, which means easier handling. Hyatt and Timken bearings are placed at all parts where wear and friction may occur. The sturdy drum is equipped with properly designed, self-cleaning mixing blades and is handled by an easy tilting wheel.



NEW 3½ E.D. mixer comes equipped with cushion, steel or pneumatic-tired wheels and towing pole or tongue.

LETTERS from Readers on All Subjects

Facts, opinions and advice welcomed here

Disgusted with "Whitewash" Investigation

Luverne, Minn.

To the Editor:

I have just read "Building Industry's Ills" in your August number of the *Builder*, and in connection with your signed editorial on the same subject, it puts a serious crimp in the line of fair thought consideration.

I am not surprised by the findings, if any, of the "Economic Committee." Those "investigations" are amusing to any student of economics. This is another case of the mountain laboring with molehill results. "The FHA was not represented." The reason is obvious to anyone who has experienced the arbitrary exactions of that organization.

Economy and exploitation are quite antagonistic in their purposes. The Sears, Roebuck evidence should teach a lesson, although the impediments recited are largely local. The examining forces appear wary of learning something that they do not wish to have revealed. Inadvertently, someone mentions "patents," and the "hush" is applied.

It is no secret that the legalized potential of monopoly is the exclusive privilege of patent rights. Anti-monopoly laws cannot molest these rights, but permit monopolistic organizations to be built around them. It is a legalized conspiracy within the law, and apparently nothing is being done about it, or is intended to be done about it.

Until open competition in buying and selling is restored, the "investigations" and "economic hearings" will remain as futile of benefits to the consumer as the findings of the Title above referred to, as no consistent effort has been made in building of low-cost houses for the lower income class, and cannot be made while being dictated to by industrialists selling electrical appliances, air conditioning, refrigeration, insulation, etc., regardless of how desirable and efficient they may be.

Until housing is left to the dictation of the prospective owner and his personally selected advisors, who can determine their own capacity to pay and accept their own restraints, housing for this class will be, as it is and has been, a sad disillusion.

There are many disturbing factors to open competition that have driven small contractors and builders from functioning—liability laws, unemployment insurance, bonding performances, social security, licensing of the trades, safety commission inspections, and many federal, state and local exactions, all requiring strict and accurate accounting and attention. These confuse and distract the average operator to a degree that compels him to accept a less troublesome means of support, thus limiting competition and opening the way to a "gentlemen's agreement" control, while the customer suffers.

It requires very little earnest investigation to disclose the fact that the house owner is not and cannot be the beneficiary in our too complicated housing activities.

W. E. E. GREENE, Architect.

Troubled by Basement Dampness

Detroit, Mich.

To the Editor:

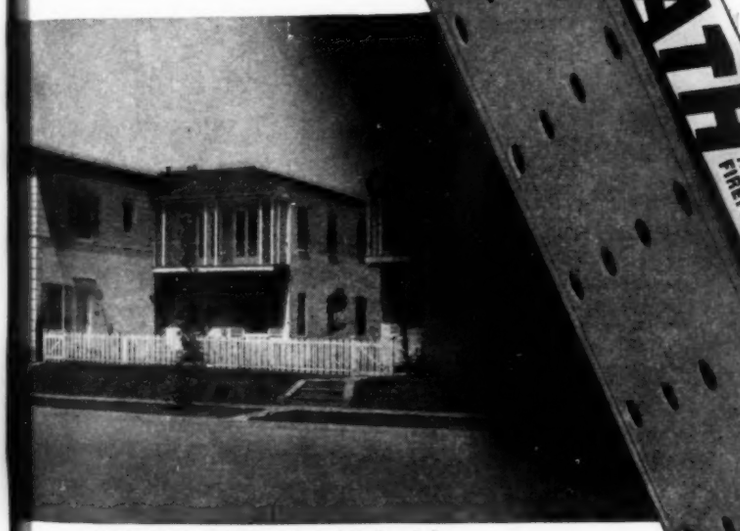
Can anyone give us some expert advice on the matter of condensation on the plaster walls in basement recreation rooms in modern houses? The walls are furred out by 2 x 4 laid on the flat side over the cinder block walls, and then covered with sheet rock on which two coats of plaster are applied. The condensation comes through and stands on the wall in beads as high as three or four feet from the floor. The concrete floor also has considerable moisture present on its surface, and where the floors are painted the moisture causes the paint to blister off. The condition appears to be one other than that of seepage through the

(Continued to page 90)

"The *longer* they use it—the *better* they like it"

1101 Meadowbrook Ave., Los Angeles, Cal.

Church of The Transfiguration, Los Angeles, Cal.



1112 So. Crescent Drive, Los Angeles, Cal.

Sunset Hills Apt.; Cliveden Apt.; Beverly Hills, Cal.

Five years ago, Perforated Rocklath* was unknown in Southern California. Today it is the most widely used plaster base in that area. Sheer merit accounts for its wide acceptance.

With Perforated Rocklath, contractors can add fire resistance to every building in which it is applied. Tests, conducted in accordance with American Standards Association specifications, qualify partitions of Perforated Rocklath for a one-hour fire rating.

Plaster becomes *welded* and *riveted* to the surfaces of Perforated Rocklath—producing walls that are crack resistive—that *keep* decoration good-looking and fresh. And such walls cost little, if any, more than those built of old-fashioned combustible lath.

If you're not using Perforated Rocklath—but are interested in giving your customer greater value and fire protection, get in touch with your USG representative today—or write the UNITED STATES GYPSUM COMPANY, 300 West Adams Street, Chicago, Ill.

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USG PERFORATED

ROCKLATH

THE FIREPROOF LATH

AB-9

October American Builder

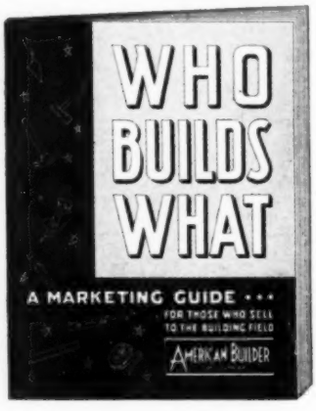
Annual Fall Design and Planning Number

THIS big special issue of *American Builder* will have a 32-page Design Section (twice the usual size) and a Reference Section with formulas, mixes, specification and installation data. This Design Section will review outstanding homes and residential developments from all parts of the country, and will strongly influence selections of materials and equipment used in structures of these types during the active fall building season and "planning months" that follow. The special Reference Section likewise assures unusual reader interest and long life of the issue.

The October *American Builder* has long-standing acceptance of readers and advertisers alike. Manufacturers of building products should make the most of this opportunity to benefit from the current fall building peak by making a strong presentation of their sales stories in the October *American Builder*. Write, wire, or phone space reservations to the nearest *American Builder* office.

The *American Builder* audience is comprised of more than 70,000 active building men who control buying in more than 70 per cent of the nation's residential and light-load-bearing construction. The operations of typical *American Biulder* readers are described in a marketing guide entitled, "Who Builds What." This new and original research material shows the number, values, and types of buildings erected by typical workers in 1938. It shows interesting variations in the volume of work done by building men in cities and towns of all sizes, and variations in the volume of work done by building men of major vocational classifications.

If you are a manufacturer of building products, or an advertising agency with building accounts, and would like to read "Who Builds What," please write on business stationery and a copy will be sent promptly. This comprehensive study of the most important audience in the building industry may help you decide to launch an active promotional campaign that will begin in the October *American Builder*.



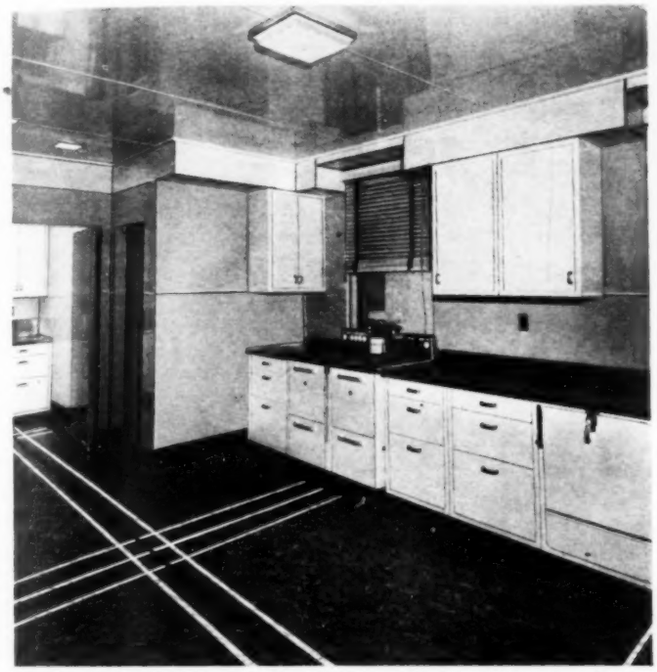
AMERICAN BUILDER

THE WORLD'S GREATEST BUILDING PAPER

CHICAGO, ILLINOIS
105 W. Adams Street

NEW YORK CITY
30 Church Street

For a kitchen floor with SALES PERSONALITY



This distinctive modern kitchen floor was achieved with Armstrong's Linoleum in Green Marbelle No. 06, with crossed feature strips of Ivory Marbelle No. 03 and Evergreen Plain Linoleum No. 21.

Use colorful Armstrong's Linoleum—the nationally advertised flooring

WHEN the name "Armstrong's Linoleum" is mentioned to a prospect, there is a smile of recognition. Years of national advertising have sold the beauty, long wear, and easy-cleaning qualities of Armstrong's Linoleum to the people who buy or rent your houses.

And there seems to be no end to the scope of this modern flooring. Almost every day, someone finds a new way to use it in creating distinctive floors that are a real aid to sales.

Armstrong's Linoleum fits into any plan or budget—not merely for the kitchen, but for every room in the house. It is reasonable in cost, inexpensive to install, comes in five different thicknesses and 200 patterns.

We publish a color-illustrated book of sales-building suggestions for residential floors. A copy is yours for the asking if you will write the Armstrong Cork Company, Building Materials Division, 1218 State Street, Lancaster, Pennsylvania.

RUBBER TILE • LINOTILE (OIL-BONDED) • ASPHALT TILE

Armstrong's LINOLEUM and RESILIENT, NON-CERAMIC TILES

CORK TILE • LINOWALL • ACOUSTICAL CEILINGS

Bill gets a tip on the train

Bill: They certainly do dress-up railroad cars these days.

Ed: Yes. I understand they use Masonite Tempered Presdwood. Boy! That board has to be tough to stand up in a railroad car. It's light-weight too.

Bill: Our builder wants us to remodel our living-room with Masonite Tempered Presdwood. He says we can get a great many different, *expensive-looking* effects with it.

Ed: Why not try it, Bill? Dozens of my other friends have, and they're completely sold on it. Tempered Presdwood can be painted or enameled. It looks swell in its own natural, brown finish. And it doesn't cost much.

Here's Bill's Remodeled Living-room

The upper walls and ceiling are durable, moisture-resistant Masonite Tempered Presdwood, painted gull-grey. The wainscot is the same material, unpainted. Ideal for homes with children, because Masonite Tempered Presdwood resists scuffing, and does not show finger marks. The built-in desk and bookshelves are Masonite Tempered Presdwood, clear-varnished.

It's Right MASONITE

Masonite

THE WONDER WOOD OF A THOUSAND USES

Sold by Lumber Dealers Everywhere

CLIP AND MAIL THIS COUPON

FREE!

MASONITE CORPORATION, *DEPARTMENT AB-1*
111 West Washington Street, Chicago, Illinois

Please send me FREE sample and more information about Masonite Tempered Presdwood for new and remodeled homes.

Name_____

Address_____

City_____ State_____

LETTERS—

(Continued from page 86)

side walls or at the intersection of the walls and floor. The side walls have been carefully waterproofed at time of construction and drain tile laid both inside and outside of the footings.

We are of the opinion that it might be a case of where the only solution would be to run a continuous line of vent openings at the ceilings and at the floor of the outside walls in the spaces between each set of studs. Any information or reference you can give us on the subject would be much appreciated.

We are today writing the Angier Corporation of Framingham, Mass., who have a catalog reference in the last issue of your magazine on their product "Copperskin." We can appreciate that something of this sort would be of definite value in new construction, and we plan to get their literature and be fully posted in the matter for that purpose. But we have several residences already built in which the condensation problem is present and varies with the weather, and it is for this existing construction that we endeavor to find a solution.

FRENCH MORTGAGE AND BOND COMPANY,
By Wm. C. Oddy, Secretary-Treasurer.

* * *

How to Estimate

(Continued from page 81)

Outside Door Jambs: The jamb is that part of a frame into which a door is fitted and hung. A door frame requires one piece of stock to make the two sides and head jamb.

The width of the stock used is determined by the type of construction. The width of the stud plus the thickness of material on each face of the framed wall equals the exact width of the finished jamb. Specifications will state thickness of jambs. If the wall is not standard construction an architect usually draws a special detail of this item.

Rule: The length of the jamb stock is computed as follows: Twice the door length plus door width plus 12". Then increase to a standard length of lumber.

Pulley Stiles: Pulley stile is that part of a double hung window frame into which a window is fitted and hung. It is made with a 3/8" groove near the center into which the parting bead is fitted. This bead separates the upper and lower sash of a window. Two pulleys are fitted into each stile, near the top end, hence the name pulley stile. Sash balances are sometimes used in place of pulleys but the term "pulley-stile" still applies.

If the width of the pulley stile is not given on the detail sheet, determine exact width of the finished wall. This will be stud width plus thickness of lath and plaster on the interior, plus thickness of exterior finish. Then subtract the thickness of the blind stop, usually 3/4". (See figure 3.) This will give width of the pulley stile. The standard thickness of the stile is 13/16".

Rule: Twice the length of a window, plus the width of a window, plus 12" equals required length. Then increase to a standard length of lumber. For mullion or triplet frames figure one piece for each opening as shown on plans.

Outside Casings: Outside casing is finish stock nailed on the outside face of a door, double hung or casement window frame. It is usually redwood or other weather resisting material. The size of the casing is determined from the blueprint or specifications. The square joint is used at the corners.

Rule: 1. For a single frame the rule is: Twice the length of the frame plus width of the frame plus 12"; then increase to a standard length of lumber.

2. If the frame is a mullion or triplet, the rule is: Twice the length of the frame plus the width of each window

(Continued to page 92)

How to Estimate

(Continued from page 90)

in the frame, plus the width of each mullion casing, plus 12″; then increase to a standard length of lumber.

3. Mullion casings are ordered as follows: Length of frame plus 2″ equals length of one mullion casing. Multiply this result by the number of mullions or combine lengths into standard lengths of lumber. The width may be different than the regular casing.

Brick or Plaster Moulding: On buildings with plastered exteriors the flat casing on a window or door frame is often omitted and a small moulding substituted. The size of this moulding will vary according to the exterior construction and the architect's detail. A stock size is 2″ x 2″. No brick moulding is required on the mullion jambs.

Rule: Twice frame length plus frame width plus 6″ equals required length. Then increase to a standard length.

Blind Stops: Blind stop is a piece of surfaced stock nailed to one edge of a pulley stile and serves a two-fold purpose. Formerly it served as a stop for a shutter or blind which used to be hung on the exterior of many window frames; hence its name. The hinged screen has taken the place of the blind, so the blind stop is now a screen stop. It also serves as a guide for the top sash of the double hung window.

A standard size of blind stop is ¾″ x 1½″. It is made of redwood or some other weather resisting wood.

Rule: Add twice the window length to the window width; allow 6″ more for joints; then increase to a standard length of stock. Each opening in a mullion or triplet frame is figured separately and requires one piece of blind stop.

Parting Bead: Parting bead, (see figure 3), is a small piece of ⅜″ x ¾″ stock with two rounded edges fitted into the groove of a pulley stile and separates or "parts" the upper and lower sash of a double hung window frame.

Rule: Twice the length of a window plus its width, plus 6″, then increase to a standard length of stock. Each window in a mullion or triplet frame is figured separately; therefore, allow one piece of parting bead for each opening in a frame.

Door or Window Sills: A door or window sill forms the bottom end of a window or door frame and is placed in a sloping position to permit rain water to run out.

The width of a sill will vary according to the thickness of the framed wall. There is also a projection to allow for as a sill projects beyond the face of casing stock, usually 1″. The standard thickness of sill stock is 1¾″. The shape will generally be detailed on a blueprint; if not, a stock pattern is carried by the mill.

Lumber used for window frame sills is redwood or other weather resisting material. For door sills, a vertical grained piece of Douglas fir or a piece of hardwood, such as oak, is used. The hardwood sill is generally used on a front door frame.

The length of the sill horns, (see figure 5), affects the lengths of stock required to make a sill. On frames that have a 4½″ or 5½″ casing, 12″ should be allowed. For frames that have narrow trim, or only a band moulding, 6″ is sufficient.

Rule: For a single frame, from 6″ to 12″ should be added to the width of the frame to get the sill length. For a mullion frame (see figure 5), add the combined width of the sash to the combined width of the mullion casings, then add 6″ to 12″ and increase to a standard length of lumber. Combine several sills to make a standard length.

The other three divisions of the exterior finish unit, namely, walls, cornice, and roofing, will be discussed in the next article.

LAUX REZ

Trade Mark Reg. U.S. Pat. Off.

SEALS

Laux Rez, laboratory developed synthetic resin in liquid form, seals all woods and porous surfaces. One coat penetrates; helps prevent grain raise; decreases moisture absorption, swelling and binding.

PRIMES

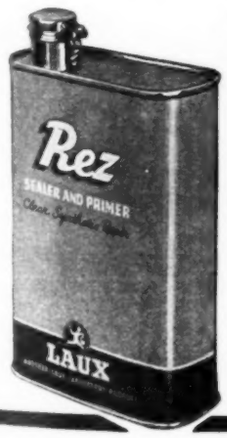
Laux Rez saves a coat of paint. As a primer, especially on soft woods, fir plywood, etc., it gives a perfect, hard surface for any paint, enamel, lacquer or stain.

PRESERVES

Laux Rez gives a hard, tough, wear-resistant, water-resistant and steam proof surface. As a finish, it provides a clear, high gloss that is extra durable. Also a superior paint thinner or reducer.

PROTECTS

Laux Rez prevents decay, guards against weathering, decreases checking. Rez treated surfaces wear longer, look better. And Rez protects the pocketbook, too—it is economical to apply!



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REZ ● REZITEX—exterior resin plastic paint.
● REZICOTE—stucco, brick, cement paint.
● PLASTEREZ—interior resin plastic paint.
Specify plywood, doors, millwork Rezited at mill.

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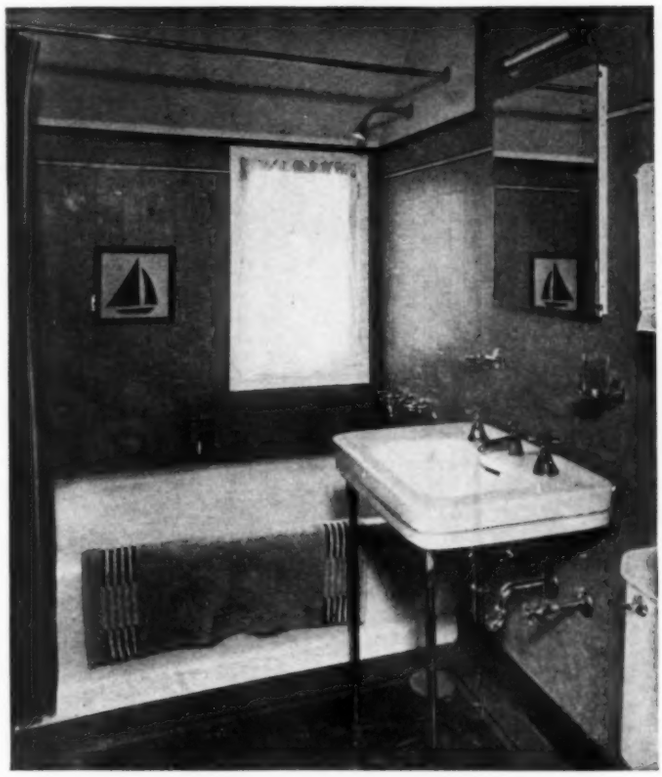
Seattle, Los Angeles, Lockport, N. Y.; Portsmouth, Va.; Vancouver, B. C.; Portland, Ore.; Spokane, San Francisco, Oakland, Phoenix, Albuquerque, Houston, Minneapolis. Stocks available nationally: Harbor Plywood Company distributors, plus Lumber Reserve Supply Co., Des Moines; Reserve Supply Co., Minneapolis; Minot Builders, Minot, N. D.; Building Service, Great Falls, Mont.; Kohler-McLister, Denver; Rust Sash & Door Co., Kansas City; 4-States Supply, Carthage, Mo.; E. W. Camp, Cincinnati, Indianapolis; Lawrence R. McCoy, Worcester, Mass.

LET TILE-TEX SELL FOR YOU



ONE look at a colorful, modern bathroom, with resilient Tile-Tex floor and decorative Tile-Tex walls will convince your home-buying prospect of the plus value you build into a home.

Simple and easy to install, inexpensive to maintain, Tile-Tex walls and floors become a positive and active sales aid. They add real live color and up-to-the-minute modern designs to the key rooms of a house. They can make the homes you build possess that added "something" that closes the sale. Baths, kitchens, laundries, recreation rooms—these are the rooms that do much to sell a home—women in particular are fussy about these areas. Build these rooms better with Tile-Tex—make them different from your competitors, and watch your sales grow.

For new jobs or for modernization work, Tile-Tex walls and floors mean low first cost and high sales appeal. Our nearest approved contractor has a real fact story for you. Ask for his name and copies of the new Tile-Tex folders on floors and walls.

TILE-TEX Company CHICAGO HEIGHTS ILLINOIS

OR YOU MIGHT CARE TO REPRESENT US IN YOUR TERRITORY

The Tile-Tex Company,
Chicago Heights, Illinois

If my territory is open, I would like to have complete information on the Tile-Tex Dealer's proposition.

Name.....

Address.....

A-9

Principles of Heating Systems

(Continued from page 67)

rooms are heated, however, by warm air led through registers and ducts from an air-heating chamber in the basement. The source of heat within this chamber is a steam or hot water coil connected directly to the regular boiler. This air chamber also contains equipment for humidifying and filtering the air. With this system extreme flexibility is assured, as those rooms where radiator heat is desired may be heated from the boiler while those rooms where warm air heating is preferred may be heated by the system of ducts. This also provides a means of circulating humidified, filtered air throughout the house.

In addition to these two systems there are many types of individual room humidifiers on the market that will provide a satisfactory degree of humidification.

Summer Conditioning

At the present stage of development, the filtering and humidifying of air are comparatively simple operations. But the equipment required for dehumidifying and cooling is extremely expensive and not always satisfactory when applied to the home. To warm a house in winter, to cool it in summer, and to filter, humidify or dehumidify the air in it at all times are as yet too expensive for the mass market. Therefore, since the requirements of heating and cooling are so different it is obviously either inefficient or extremely expensive to do both with the same system.

However, it is possible to obtain increased comfort in the home in the summer months by the installation of some device to create circulation of the air, and, likewise, to draw cool night air into the house. The fan used with a forced warm air system is not usually entirely satisfactory for this purpose because of its limited ability to move large volumes of air, and it likewise is not practical to install a more powerful fan because of the detrimental effects of over-forcing the heated air in the winter. The simplest method of securing increased circulation during the summer is in the installation of an attic fan. Through the proper manipulation of windows, such a fan will provide satisfactory circulation in any home. It will also circulate cool air during the night.

* * *

Systematized Production

(Continued from page 46)

explained that he can have a fireplace for $150 extra, or a 7 by 13 ft. rear porch, $225. Prices quoted for other extras include: Sidewall insulation, $125; weatherstripping all windows, $40; iron railing on stoop, $25; screens for all windows, $65; sectional overhead door, $40; storm sash, all windows, $60; tile wainscot in kitchen and bath, $70; colored bath fixtures, $40; 2-car garage, $200; extend rear wall 1 foot, $200; extend front 18 inches, $100.

"Our idea is to take as many future headaches out of the house as possible," Dunham told *American Builder*. "Through better buying methods and systematized construction we are creating a model community, demonstrating the principle that savings can be built back into the house in quality construction.

"We have what amounts to production line methods in operation, and through experience in other cities I have proved that these methods can be applied anywhere. We are equipped to organize and carry out housing projects for interested persons in other com-

(Continued to page 96)

Systematized Production

(Continued from page 94)

munities, from the original survey to the completion of the final detail.

"No one has ever built a perfect house—but we are trying."

Specification Details

A partial list of features and specification details of Orchard Park homes is as follows:

HEATING—Sunbeam gas-fired winter air conditioning unit by Fox Furnace Division, American Radiator Co., complete with blower, filter, motor and steel heating element. Basement duct work, trunk line design with splitter type dampers at each branch takeoff, and quadrant damper at each warm air branch; ducts to be 27-gauge metal, except where over 12"—26 gauge. All hot air supply lines in exterior walls insulated with ¾" hair felt. Same insulation placed between top of ducts and first floor to prevent warping of flooring. All rooms have return ducts except kitchen and bath, which are vented.

FOUNDATIONS—Cinder concrete blocks, top course solid. Lehigh portland cement with Anti-Hydro waterproofing. Two ⅜" reinforcing steel rods 6' long placed under each cellar window, 1 course below sill. Foundation walls below grade plastered with ½" waterproof cement. Above grade, stucco.

BASEMENT FLOOR—Transit-mixed Lehigh cement (4 inches) with Anti-Hydro waterproofing.

FIREPLACE—Selected brick with Covert dampers.

FRAMING LUMBER—Weyerhaeuser kiln-dried 4-Square lumber, moisture content 12%.

SHEATHING—Weyerhaeuser kiln-dried, end-matched, tongued and grooved sheathing, laid diagonally to increase strength and durability, provide airtight sealed construction.

DOORS, WINDOWS, TRIM—Andersen windows, rot and termite proofed. Kuhlman weatherstripped, Unique sash balances. White pine Morgan Colonial doors, Morgan trim, doweled, mitred and glued. Authentic Colonial mantels.

FINISH FLOORS—Clear white oak, Appalachian flooring.

GARAGE DOORS—Wel-Bilt overhead garage doors.

ATTIC STAIRS—Bessler disappearing stairs to attic—Bessler Disappearing Stairway Co., Akron, Ohio.

WATER HEATER—Allen insulated automatic domestic gas.

STUCCO—Medusa Cement Co. white cement.

LATH AND PLASTER—National Gypsum Co. full floating lath nails to prevent plaster cracks. National Gypsum Cornerite metal lath and rock lath and plaster.

PLYWOOD—Closet shelves built of ¾" Douglas fir plywood by U. S. Plywood Corp. ⅝" plywood also placed under linoleum in kitchen floor.

KITCHEN EQUIPMENT—Morgan knockdown kitchen cabinets, Standard sink, Magic Chef gas range, Electrolux gas refrigerator, Armstrong linoleum laid over ⅝" plywood.

BRASS PIPE—Chase Brass Co. all-brass water pipe and 15-oz. copper flashings throughout.

LEADERS—All leaders are lead-coated copper by Ledkote Copper Products Co., eleminating staining or paint.

ELECTRIC WORK—Walker New Process Armored cable. G-E tumbler switches, duplex pin-type receptacles. Pilot light switch to control cellar light. Lighting fixtures by Orange Lighting Fixtures Co., Newark, N. J.

BELL WORK—Edwards flush-call type.

EXTERIOR PAINTING—All exterior woodwork primed or stained as fast as erected. Trim and blinds 3 coats Cabot's gloss Collopakes in colors. Balance of woodwork including wall shingles and screens, Dutch Boy white lead with Archer-Daniels "Polomeric" linseed oil delivered in sealed cans. Roof shingles, 1 coat of stain. All iron work 1 coat red lead with 2 coats finish paint.

INTERIOR PAINTING—Woodwork given 2 coats flat paint, well rubbed between coats, then finished with eggshell enamel in color approved by builder.

CEILINGS—Sunflex casein ceiling paint.

EXTERIOR SHINGLES—Oregon red cedar, grade A, kiln-dried 24" shingles.

FINANCIAL COSTS—All costs such as title search, recording fees, legal service, FHA fees, architectural service are included in sales price.

Engineering a SOUND Heating System

(Continued from page 69)

bidders, it avoids a half dozen or more different layout ideas, some good and some not so good, but all creating unequal bidding. A "crack brained" plan and price is pitted alongside a really worthwhile proposition all the way through. A job that will give satisfaction cannot be offered at a bankrupt price to meet the "crack brained" offer. Yet, how often builders grasp at the "low price," yet expect this sort of proposition to give them the same results that the better offer of another can give them. The quality and capacity of such a unit is usually to be severely left alone. When the operative builder has his own heating plans prepared for him and adhered to, the bidding is eminently equal—fair to all—with no varieties of ideas being offered, good or bad. The only major differential possible in this plan occurs in the difference in the several makes of units offered, and the price the installer figures he can fabricate the ducts and erect to your plan, and how he estimates labor cost. The essential thing here is that you control, through your own engineered plans, the ability of the system to function satisfactorily and provide the heating comfort the owner buys and is expecting to receive.

The whole building industry has suffered in recent years by the lack of competent heating engineering advice. You simply cannot handle an air job carelessly and get away with it; sooner or later you are headed for a great big "headache" if you do.

Scientific advance and progress in the winter heating and air conditioning field particularly has been so rapid that many have failed to keep pace with it. What was considered good practice today is obsolete in the next few years hence. The old "rule-of-thumb" methods no longer hold—and they never were satisfactory.

The modern heating plant must be engineered with a view to many intricate and scientific factors—and such work should be done by a disinterested expert who can advise honestly—with no fish to fry—about the merits of various types of installation and equipment, and how it should be installed to provide satisfactory comfort.

Obviously, a general contractor or speculative builder cannot be expected to be a highly technical expert on heating, but it will pay him large dividends to study this field more thoroughly and find out what constitutes good modern practice.

How to Avoid Troublemakers

Such troublemakers as undersized, inadequate plants, improperly engineered duct layouts which fail to consider the heat loss from the various types of construction, the saving benefits from insulation of ducts, in other words "headache" installations which prove costly to operate, are a "black eye" not only to the builder but to the maker of the equipment, to the architect and to the entire building industry. The owner buys comfort—he does not know how he should get it, *but* he should get what he buys.

What can the builder do to insure a satisfactory heating job? Here are a few practical matters that he should consider. The subject has so many ramifications that these are necessarily very sketchy, but they will call to mind some of the factors that make for a satisfactory installation of a good winter heating and air conditioning system.

13 Cardinal Points

1. COMPETENT EXPERT ENGINEERING ADVICE—Retain the services of a competent local heating engineer who knows local conditions as well as his business. Have thoroughly detailed heating drawings prepared before framing starts. Show thereon duct sizes, position of runs, openings and complete installation details to eliminate guesswork in bidding and later when installing the system. Give the engineer ample time to make computations and prepare plans carefully, don't rush him, he can make mistakes as well as anyone else, and these, if not caught, can be not only troublesome, but also costly to correct after the plant is installed.

2. LOW PRICE—Take bids from a reputable heating contractor with sound engineering background. *Don't depend on price alone.* Especially in low cost work, don't expect the impossible. However, low cost jobs can be designed by a competent engineer that will give satisfaction for the money, *but avoid*

(Continued to page 100)

Engineering a SOUND Heating System

(Continued from page 98)

"headache peddlers." Here's where they shine while later you cuss. If there is a marked difference in the price of bids, inquire as to the reason. Generally you will discover good and sufficient reasons for a $25 or $50 higher difference in price that is justified, against what is being offered by the "peddler." You probably will, without doubt, save money in the end by accepting the higher price job because that bidder unquestionably knows what he is doing and what he is giving you for that money. You doubtless would be greatly astonished to know that he probably is not making as much profit on his bid as the other lower priced man whose bids appear so attractive. Here is an instance where *we can only caution builders to BEWARE. Burn your own fingers if you want to, but DON'T CONDEMN THE INDUSTRY* just because you, as one individual, were so foolish and did not take the precaution to consult a reliable, disinterested engineer. Here is a situation where you should consider and consult your heating engineer just as much as you do your architect or doctor.

3. CONSIDER EXPOSURE—Every heating job should be considered a separate problem. You erect a number of houses from the same general architect's plan; you build them "willy-nilly," setting them down over a development facing all points of the compass; and while the same general basic heating design for a given type of building may not change, it is affected by the exposure direction, and the installation duct and register sizes should be changed for different exposures. A living room on the north side requires a different treatment than one facing south. Prevailing wind direction must also be considered.

4. ADEQUATE CAPACITY—Install a heating unit of adequate capacity—a unit having 20 to 25 percent reserve over the carefully calculated actual heat loss of the building. This will avoid forcing the unit and conserve fuel—it saves fuel dollars.

5. AIR FRICTION—Ducts must be laid out scientifically so that air passes through easily without excessive pressure or friction loss. Bends should be at easy angles; there should be *no* right angle bends, unless internal duct turns are installed. A 45-degree bend creates friction or resistance to air equivalent to approximately 5 feet of a straight run of the same size.

6. SUFFICIENT RETURNS—Provide sufficient air returns—at least one from every room, except kitchen, bath, laundry and garage, which latter air should not be recirculated. These should be exhausted or vented out through baseboard grilles and ducts run up to and into the attic space. Garages should be vented to the outdoors.

To balance the system as well as provide fresh air for ventilation, the non-recirculated, exhausted or vented volume of air is made up by the introduction of outside air into the return system, otherwise the system would not be handling through the return the same volume of air that it does through the supply.

7. LOCATING REGISTERS—Warm air supply registers should be located scientifically to warm the rooms evenly; a careful designer will give due regard to the "spread, throw and drop" of air of the type and make of register specified. They must be placed with due regard for furniture locations. A davenport or large overstuffed chair cannot be placed over a warm air supply register, but may be placed over a baseboard return air grille.

Different types of registers do not have the same air capacity although each may be of the same size, and when an installer is left to erect anything he pleases other than what the engineer calculated for and specified, difficulties will immediately develop.

8. CONSTRUCTION ANALYSIS—A thorough analysis of the construction methods and materials must be made before figuring heat loss. Analysis must be made of the heat conducting qualities of various types of wall, ceiling and floor construction, as well as the factors introduced by insulation, weatherstripping and other construction features.

Any designer who will take a few extra hours to study the construction features and the architect's plans and prepare an analysis sheet of calculating factors for the temperature difference of the various items won't miss out on some important detail that would give trouble later.

9. ROOM ANALYSIS—A room by room analysis, or space heated analysis must be made, figuring heat losses in each through window glass, cracks around windows and doors, walls, ceilings and floors. The heat loss analysis must be worked out in careful

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Engineering a SOUND Heating System

(Continued from page 100)

detail, and there is *no* substitute for a complete detailed engineering analysis of this type.

10. TEMPERATURE DIFFERENCES—Calculation should be made of the heat loss per square foot, per degree, per hour. This is based on the temperature difference between the inside heat requirement and the outside prevailing temperatures. This also applies to the temperature difference between one room heated at a given degree, while the adjoining room is held at a lower temperature. This difference must be compensated for in the higher temperature room in order to supply it with a sufficient amount of heat to keep it at its designed temperature as desired. This applies to ceilings, floors and inside partition walls.

In the New York area, for example, zero is a commonly accepted outside design temperature base; however, in some adjacent areas, particularly in New Jersey, within the so-called New York Metropolitan area, there are outside temperatures which the designer should consider at five degrees below zero (—5° F.) in his heat loss computations, but there are many who do not. At this writing there are plans before the writer for a group of small low cost buildings in a town not over thirty miles from New York City, where the outside temperature base is five degrees below zero, and where the architect specifies to heat the rooms at 70 degrees when zero outside. Whether this architect knows anything different about this is an open question, but should some one plan installations for this group of buildings on that specification basis without taking the matter up with the builders and the architect, you can well judge the outcome of conditions within these homes when a real below zero period arrives during the winter, and no one can foretell when this will come. Regardless of this particular architect's present specification in the case in point, any careful heating engineer will take the bull by the horns and design and calculate properly at a five degree below basis and outline his reasons therefore to the builder and point out the higher heat loss obtained which might affect the size of the unit in capacity. He will do this despite competition which goes ahead on the zero basis in this development, perhaps not knowing the difference. These are some of the reasons for troubles in installations and are some of the finer points a careful engineer will discover and allow for. Perhaps this particular architect does not know that he has made a temperature specification for a territory that, while not so far removed from his office where zero is an acceptable base, will bring trouble upon those who blindly accept his temperature specifications. Doubtless this architect will be considerably surprised when it is pointed out to him that he might better revise his temperature specifications for the particular community in point.

11. INSULATED DUCTS—A careful consideration of duct locations may lead these to sometimes be placed in outside walls or through cold areas. In such cases the ducts should be well and thoroughly insulated. There is no sense in heating the outdoors, unexcavated areas or cold storage rooms through which duct may have to be run.

12. TECHNICAL INSTALLATION CODE—Houses should be engineered according to the revised new Technical Code of the National Warm Air Heating and Air Conditioning Association. This code should be closely followed and if its provisions for the calculation of heat losses and design of installation are conscientiously carried out the plans of a qualified engineer will insure a satisfactory installation.

13. HEATING INSTALLATION INSPECTION—Frequent inspection by a qualified heating engineer during the course of installation of the system will insure a more satisfactory job and will in the long run achieve economies for the builder by preventing any possibilities of errors in installation, or any attempts on the part of the installer to skimp and cut corners other than the provisions in the heating plans. It also discovers if he has attempted to use his own ideas about changing duct sizes without realizing the disastrous results his action will cause. It also makes possible last minute changes on the job due to unforeseen factors or a change of mind by the owner, without nullifying the original calculations.

The engineer can advise on changes on duct location and other matters that, if done without a technical knowledge of the operation of the system, would throw it out of balance.

Such an inspection cost is nominal and well worth while on the part of the builder. It will keep the owner off his neck later.

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He wants it enduring
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For both he can please
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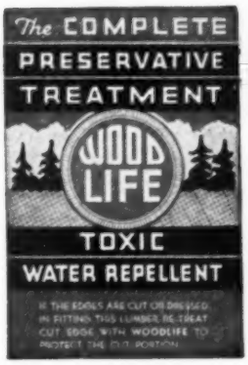

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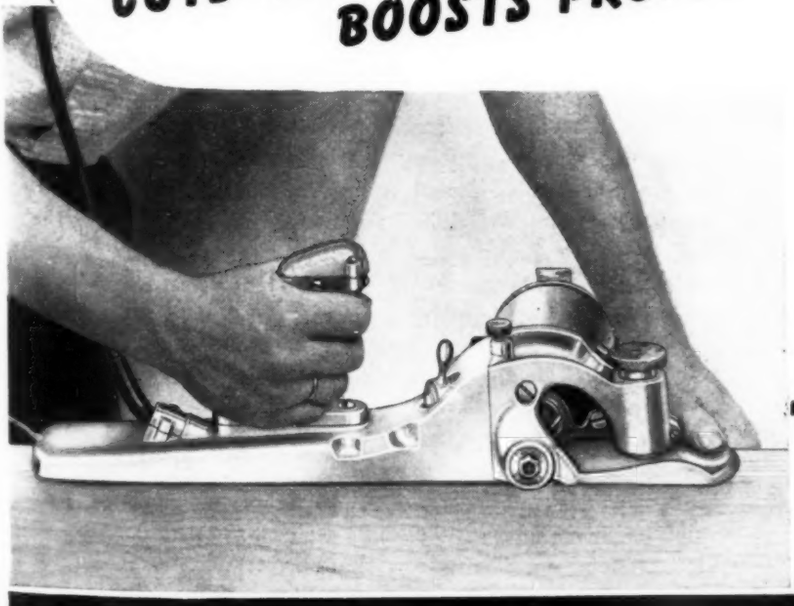

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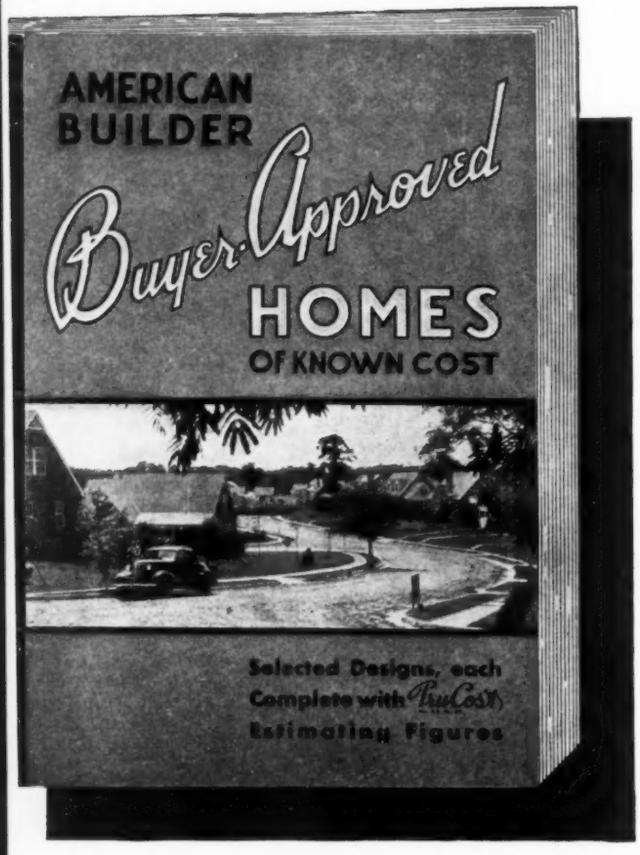


180 pages, 8½x11½, 331 illustrations—163 exterior and 45 interior views, and 123 plans, elevations and construction details.

Every one of the 96 Homes presented carries its own "TruCost" figures, insuring quick and accurate estimating. At the end of the book are 10 pages of Survey Figures for these 96 homes and 27 pages fully explaining the "TruCost" system.

These homes come from every section of the country—they include good examples of all the popular architectural styles—all have been recently erected and bear names of producers that are to conjure with.

Pictures, of course—scores of them. Beautiful exterior and interior views, reproduced from actual photographs by the latest methods of modern illustrative art.

If "American Builder Buyer-Approved Homes" were to stop right there, it would still stand out head and shoulders above any Planning Book ever published. For these illustrations are of such unique charm and of such irresistible sales appeal as to make the book of material assistance, in themselves, to the architect, the builder and the prospective home owner in coming to decisions and in working out the details of the home to be.

But Besides the Pictures

there is in the book an immense amount of new, useful, complete information concerning, not only the 96 lovely homes presented in its 180 pages, but also modern, economical home building in general.

Articles by experts, for instance, on such timely subjects as getting 100% more livability at only 2% increase in cost through planning providing for adequate electric wiring, with several plates of suggestions for switches, outlets, lighting and equipment details—how to build new standards of convenience in today's kitchen, showing how better kitchen planning, improved materials and co-ordinated equipment contribute to make this important room a center of high efficiency and beauty in the better modern house—how planning saves plumbing costs by anticipating and protecting against frozen pipes, arranging hot water pipes to function with a minimum of heat loss—how builders can build up profits by installing built-in mirrors—A modernized basement that took the cake in a Chicago Prize Contest—and will take the eye of every housewife to whom it is shown.

This is information not commonly met with. It is all dug out of the actual experiences of highly successful architects and builders. Together with the home designs, the ample floor plans, the cost data, the outline specifications, etc., it makes the book a thorough-going guide to the planning, the building and the equipment of the home of today and tomorrow.

More Details on Next Page

Continued from preceding page

These Unusual Homes of Unusually Successful Operative Builders Were Quickly Sold

They therefore give a direct line on the kinds of homes people want today and preview the homes that will be built tomorrow.

Portland Model Home

triple-insulated, planned carefully for good living and recreation space, with garage cleverly concealed under high gabled roof. Attracted more than 10,000 Oregon visitors in six weeks. (Pages 8 and 9)

The Colonial Charm of Old Williamsburg

re-lives in two fine homes presented on pages 18 and 115—one at Port Washington with walled court in rear, and one at New Rochelle, in the $5,000 class ($598 down and $48 per month).

Well-Planned "Plymouth Haven"

small homes grouped about a court, with a quaint Colonial atmosphere, featuring Puritan setting and historical names. (Pages 34 to 36)

Olsen Basementless Homes at Pittsburgh

have done much to popularize the "Utility" type of house. In a later home (page 30) the ceiling has been brought down 14 inches, which adds to the ease of heating and the comfort of the occupants.

"Northwood" Homes at Baltimore

provide spacious, well-proportioned, thoroughly ventilated rooms, ample closets and many new comforts for houses enclosing a fairly small cubage. (Pages 44 and 45)

Mass Production at Clairton, Pa.

Gilbert & Varker engineers adapt large job methods in small home building in a 1,200 house project, using factory fabricated stairs, windows, trim and precut lumber. Full details, with 17 illustrations on pages 106 to 110.

"Cottage Homes" in Swanky Westchester

in which the plans were not just drawn but engineered. Interesting exterior view and floor plans of one of these charming 4-room basementless houses are given on page 111.

Florida's Largest Low Cost Home Development

meets with immediate success. Sales begin to boom even before construction starts, 25 being sold by the Lester F. Preu Organization at Miami Beach on the first day of the announcement of the project. Several of these houses are presented, with full details, on pages 116 and 117. They are well worth your study.

These are But a Fraction

of the 96 attractive homes presented in the book. To mention a few others:

Rambling Colonial in Rural Connecticut . . . A $40,000 Quality in a $6,000 house . . . Dry-Wall Homes for $43.85 per month . . . The "Picture Home" at White Plains . . . A Builder's Own Home in French Mansard Style . . . Modern Cottage with Plywood Interior . . . A picturesque 5-level house . . . Home styled from a California Ranch . . . Two well-done Florida Bungalows in Concrete Masonry . . . Texas Cottage of 11,350 cubic feet designed for families of low incomes . . . "Orchard" House from Mississippi . . . House put together with Screw Nails . . . All Hardwood Home built for 300 years at Montgomery . . . A Gem from the Old South . . . A section of Home Designs for Summer Comfort—cottages, week-ends, bungalows . . . Country Homes with all city conveniences—Streamlined ideas for Modern Apartments and homes for more than one family.

$100 Heats 54 x 34 Ft. Country Home

(Continued from page 72)

which the heating load, duct and riser sizes were arrived at are reproduced. The work sheet clearly shows the cubic contents of each room and the method of figuring its heat losses. The calculations provide for prevailing winds and also make separate estimates for basement walls above grade and below grade.

Not only are the warm air ducts and returns scientifically worked out as indicated in the work sheets, but the details are clearly shown on the blueprints. The size of register and riser, the velocity and volume of air at each opening are clearly indicated on the blueprints, thereby eliminating any possibility of doubt at any time.

Details of the air circulating system may be noted on the accompanying floor plans. Among the features of the installation to which special attention might be directed are the volume dampers in all supply and return lines and the splitter dampers in the trunks at all branch takeoffs. These dampers are all equipped with locking quadrants, and their positions, after balancing, are clearly marked on the ducts, so that any alteration of these damper positions after once being set may be quickly returned to their proper setting.

All duct branches to warm air supplies and return air risers have a neatly printed label with the name of the room and the riser number corresponding to that on the floor plans, which makes it easy for anyone to determine in the basement to which room any particular duct leads. This facilitates adjusting dampers and determining the position of duct runs.

The supply ducts in the garage are fitted with aluminum back draft dampers which close automatically when the blower is not running. In addition, there is a weighted drop damper outside of the duct, held open with a chain and fusible link, which will operate automatically in case of fire.

Registers Under Windows

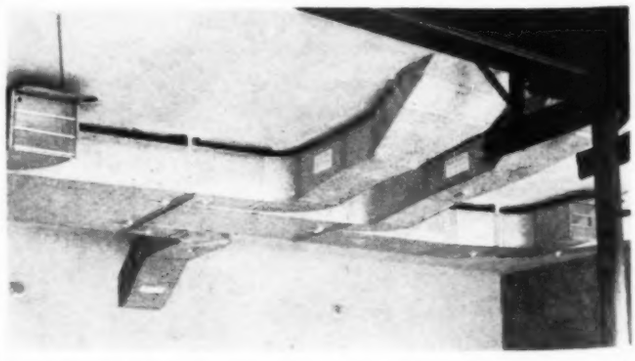
As will be noticed on the basement plan, there is an intake for outside air designed to supply the necessary make-up air, to counterbalance the amount not recirculated from the kitchen and bathrooms and lost by seepage to the outdoors. By this same method heat is supplied to the ship room, garage, one bedroom and bathroom on this same floor, the supply registers of the four-way adjustable type being at the ceiling level. A study of the plans will also reveal supply and return registers and grilles so placed as to provide excellent distribution throughout the house. Several of the risers are on the outer walls and in a number of instances the registers are placed directly underneath the windows. This is somewhat of a departure from general practice, but the good judgment of the engineer was indicated in this instance by the satisfactory operation of the unit during the past season.

Quality Materials Throughout

While special emphasis has been given in this article to the heating and layout, it is readily apparent to any builder that even the best heating system cannot function in a poorly built house. Quality materials and construction were followed throughout. A partial list of specifications, which illustrates this point, includes the following:

FOUNDATION—Double 8-in. cinder block on 28-in. footings below grade; 8-in. cinder block and 8-in stone in clear to first floor.

(Continued to page 108)



SUPPLY DUCTS in basement, each clearly identified. Note back-draft vanes and fire closure in outlets.

$100 Heats 54 x 34 Ft. Country Home

(Continued from page 106)

First floor 8-in. reinforced stone veneer, applied over Johns-Manville Steeltex lath; second floor reinforced stucco, applied over Johns-Manville Steeltex lath; Owens-Illinois glass brick furnished by Anderson Supply Co., New York.

STEEL WINDOWS—Detroit Steel Products, Fenestra Fenwrought casements, vertical muntins omitted, complete with Roto Adjusters and bronze wire cloth screens.

LATH—U.S. Gypsum Rocklath with 3 coats plaster. Garage ceiling metal lath with 1-in. cement plaster.

INSULATION—Johns-Manville Rockwool 4-in. batts in exterior side walls, ceilings and under decks.

HEATING—Winter air conditioning, Premier Furnace Co., Dowagiac, Mich., Automatik air conditioner, fired with an Iron Fireman bin-feed coal stoker with automatic ash removal, installed by Fred L. Walters & Son, Chatham, N.J. System designed by John J. Kautzmann, East Orange, N.J., installed by Kuhles Co., Irvington, N.J.

ROOFS AND DECKING—Barrett specification built-up asphalt roofing, supplied and installed by Paul M. Ritter Roofing Co., Morristown, N.J. Decks—2-in. concrete slab applied for traffic surface.

PLUMBING—Briggs Manufacturing Co., Plumbing Ware Division, Detroit, Beautyware fixtures throughout. Piping, Anaconda copper tubing with sweat joints, installed by Paul V. Tiger, Basking Ridge, N.J. Recessed wall cabinets and bath fittings, The Philip Carey Co., Miami Cabinet Division, Middletown, Ohio.

LUMBER, FRAMING, FLOORS, ETC.—Well seasoned No. 1 West Coast fir, platform type framing, diagonal bracing; diagonal subflooring; quartered red oak finish flooring. Floors finished with Lignophol manufactured by L. Sonneborn Sons, Inc. Construction materials furnished by The Bernards Builders' Supply Co., Bernardsville, N.J.

CIRCULAR STAIRWAY—Installed by George Hartfelder, Plainfield, N.J.

STAIR RAIL—Aluminum and wrought iron in modern design, by James R. Marsh, Essex Fells, N.J.

DOORS—Johns-Manville flush type birch doors.

GARAGE DOORS—Overhead type, manufactured by Better-Built Door Co., Philadelphia, Pa.

BATHROOMS—Monolite panels in pastel shades with Pyramid stainless steel moulding, supplied by Willard C. Ford Co., New York.

KITCHEN EQUIPMENT—Boro Wood Products Co., Long Island City, N.Y., cabinets, composition counter tops, breakfast tabletop; Edison-General Electric, Hotpoint electric range; Stewart-Warner refrigerator; Signal kitchen-exhaust fan.

HARDWARE—Modern dull chrome finish on brass with plastic knobs in pastel shades, interior; dull chrome finish on brass, exterior; Reading Hardware Co., Reading, Pa.

ELECTRICAL WORK AND FIXTURES—Electrical fixtures in modern design by Lightolier, N.Y. Cove lighting and indirect lighting and installation of electrical equipment by Fred J. Klein, Basking Ridge, N.J. Flexible steel armored conduits, radio outlets throughout, flush telephone outlets first and second floors, weather-proof outlets on outside decks and terraces.

PAINT—Exterior, 3 coats of Coppercote by American Coppercote Co., Brooklyn, N.J. Interior, U.S. Gypsum Texolite cold water casein paint.

WALL COVERING—Foyer and entrance hall, Salubra wall covering by Frederick Blank & Co., N.Y. Painting and wall covering applied by Joseph Sassi, Bernardsville, N.J.

FLOOR COVERING—Bathrooms, foyer, hall, kitchen, laundry, Congoleum-Nairn linoleum applied by Art Craft Floor Service, Morristown, N.J.

PUMPING PLANT—Deep-well Myers pump, 12 gals. per minute rating, 350-gal. pressure storage tank, fully automatic, furnished and installed by Dale Feakins Co., Ledgewood, N.J.

VENETIAN BLINDS—Venetian blinds installed throughout, Western Venetian Blind Co., N.Y.

CABINET WORK AND FURNITURE—Circular cabinets in living room and furniture throughout designed by Modern Mode Furniture Co., N.Y. Modern Chinese rugs, Elbroak, Inc., New York. Mural painting of modern design on circular wall in living room by Leon Dolice, Asbury Park, N.J.

Air Conditioning Today

(Continued from page 73)

home air conditioning has been obstructed and delayed more than we realize, by the kind of show some engineers have put on—the kind that, apparently, the engineers are prone to put on, just because they are engineers. If they didn't love to make things complicated, or at least seem complicated, so they can show how smart they are to be able to work them, they wouldn't be engineers.

They've done a better job advertising home air conditioning's complications and difficulties than we have so far of advertising its simplicity, comfort and convenience. But Truth is mighty and shall prevail—even if Error has a bigger appropriation.

All we need do is to hammer it home; by word of mouth among our own crowd; in public talks wherever we get a chance, at the Rotary and the Kiwanis and the Lions and the Chamber of Commerce; across the bridge table when we need to distract attention from an unfortunate double or an injudicious finesse; and in all the more usual channels—direct mail, newspapers, bulletin boards—any home that has a warm air furnace can be fitted for complete, year-'round air conditioning quickly, simply, easily and in most cases at reasonable expense.

What we need to do, and what we can do if we all pull together, is to make *everybody* see that "air conditioning" is not just an elaborate and tremendous engineering development, for textile mills and food processing factories and streamlined trains and movie palaces; that it's just an engineer's grandiloquent name for plain home health and comfort.

Naturally, before you can convince anybody else of that fact, you first have to convince yourself. But . . . even if I have not yet convinced you . . . that shouldn't be hard for you, if you care to take the trouble. The literature on the subject is both varied and voluminous, and increasing every day. Naturally I'm prejudiced in favor of my own Association's publications (counting with them the University of Illinois bulletins which describe the work done under our research fellowship). But there are plenty of other good, practical texts—for example, Mellish's "Simplified Lessons in Cooling" has helped me quite a bit in preparing these articles.

But if I were you, I would lay out a program for myself, something like this: First of all, I'd assemble a small library.

I'll send you a list of the books and pamphlets *I* think you ought to include, if you'll write and ask me. (At the top of this you'll find a booklet recently published by the National Warm Air Heating and Air Conditioning Association entitled "The Secret of a Comfortable Home." I recommend this not because I played a part in its preparation but because better than any other publication of its kind I know it covers the subject in capsule form from the consumer's point of view.) I'd devote about a week of evenings to some intensive boning. Not to master the subject; that will come later. But to get its main outlines sufficiently clear in my mind so I can talk about it to the average intelligent neighbor without getting balled up.

Then, before I did another blessed thing, I'd sally forth. For at least another week (I think, myself, I'd make it two), I would assume what, according to the Book of Job, might be considered a Satanic role. I would spend those two weeks going to and fro within my own home town, and walking up and down in it, every evening and as many afternoons as I could spare. And before every home in which, in the evening a light in the living room, or in the afternoon open windows or wash on the line, or any other symptom, indicated that the family or at least the lady of the house was at home—I'd take myself by the hand, escort myself gently but firmly up the front steps and apply thumb pressure to the doorbell.

Then I'd introduce, in rapid succession, myself and the subject of home air conditioning. I would make it entirely clear that I hadn't come to sell something, but to find out something . . . several somethings. I would ascertain, for myself, how much or how little all these neighbors and prospective customers of mine know about it, and what their ideas, if any, are on the subject. I would find out if I could, tactfully, what sort of heating apparatus they now have in their home, and how well satisfied they are with it. I'd even try to find out how much they pay each winter for what kind of fuel.

Just how much I could find out, on any given call, of course, would depend both on my own skill at the tactful extraction

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of information, and on the disposition of the particular lady or gentleman I interviewed. But I'm confident—particularly if, as I would, I carried a pocketful of cards or a notebook, and jotted down, under the corner street lamp, all the facts gleaned on each call immediately after it was completed—I would put in a highly profitable two weeks. I would expect, during that time, to talk with at least a hundred of the people who have the future of home air conditioning in my own town in their hands, and to learn from them, at first hand, a whale of a lot more about the realities of the job of air coditioning my town's homes than I could possibly learn in any other way.

If I were the head of an organization, large or small, I'd send out as many of my staff as I could spare, or afford, to do plenty more of the same. If I could send out ten people to call on a thousand homes, I'd do it. I'd exempt nobody—I'd send out my personal stenographer and haul my bookkeeper out of his cage to make some calls.

The more every person on your payroll knows, by personal, first-hand contact, about the people upon whom his livelihood really depends, the healthier the state of your business will be. And that goes double and triple for the head of the business—which is why, no matter how many other people you send out calling, you should make at least as many of these home visits yourself as anybody. The bigger your business, the more you need to do it. The business that gets too big for its head to talk to his customers face to face—once in a while at least—has gotten too big for its own continued health.

Then, at the end of this two weeks, I'd take all the reports of all these first-hand interviews, in their own homes, with the very people who are going to decide whether or not you are going to have a share in the home air conditioning development that's coming; and I'd play solitaire with them for a while. I'd lock my office door and cut off the telephone; or if necessary I'd go home and hang out a smallpox card on the door; and I'd study those cards backward and forward and make notes. I'd count up how many of each particular kind of heating system there were, and how many coal-burners, with or without stokers, how many oil-burners and so on. I'd classify them as A-1 prospects, A-2 prospects, and so on down to C-minus.

After that I'd make up my mind just exactly what I wanted to do. Naturally here the story fans out; because what an architect wants to do with this home air conditioning opportunity is not exactly the same as what a speculative builder wants to do with it; and still less like what a local building-supply dealer or furnace dealer or heating contractor wants to do with it.

But there is some kind of opportuity—big or small—in this home air conditioning situation for every reader of *American Builder*. You know what *your* particular opportunity is better than I do. I don't know whether you are an architect, a builder, a manufacturer or a local dealer; I don't know whether you operate in one small city, one big city, or half a dozen, more or less, of either.

All I know is, that there is something for you to do, by which you stand to profit handsomely, in connection with this latest important change in the material appurtenances of American civilization. If you are an architect and get a chance to talk to the local Women's Club, or the Rotary Club, here's a timely topic for you, and here is how you can be prepared for that opportunity, both by knowing what to tell your audience, and—from your personal acquaintance gleaned during your doorbell-ringing activities—about what your audience does and doesn't know about home air conditioning, and would like to have you tell them.

If you are a builder or a dealer, here you'll have the makings of as fine and profitable an advertising effort as ever came your way, for the same reasons—you'll have something to tell all your prospective customers that, you'll have found out, they are already curious about and glad to learn.

If you need to be told what to do with *them*—I'll have to give up on you. But I'll make any modest bet you like, that in the next year or so there is going to be a blossoming of a new kind of business sign, sprinkled hither and yon in the streets of every American city from Portland, Maine, to Portland, Oregon. Some of them will appear in your city; will one of them be on *your* front door?

Oh yes; they'll read:

"SPECIALIZING IN HOME AIR CONDITIONING."

NEW INFORMATION— CATALOGS OFFERED

Readers Wanting to Receive Any of the Catalogs and Data Sheets Listed in This Department Should Write on Their Business Stationery Direct to the Manufacturer. When Writing, Mention This Department of American Builder and State Your Occupation or Business Connection.

COBURN GARAGE HARDWARE—Two new 6-page envelope stuffers illustrate the Coburn No. 300 set and the No. 400 set of "Turn-Over Hardware" and "Tip-Top Hardware," both for residential garage doors. The operation of this hardware is simple and effective. It is low in price and easy to install. These circulars give complete information, with important dimensions and details.—COBURN TROLLEY TRACK CO., Holyoke, Mass.

"COLONIAL ENTRANCES"—Ten beautifully designed entrance doors with architectural entrance trim, all in the Colonial style, are attractively illustrated in a new 4-page data sheet. A companion piece of 24 pages, in similar style, illustrates the "Embassy" factory-fitted window units of the RM line. These important home building accessories are fully dimensioned and detailed.—ROACH & MUSSER CO., Muscatine, Ia.

HOMELITE PORTABLE ELECTRIC PLANTS AND PUMPS—The use of electric tools on a job where electric power is not yet obtainable is made clear in a new 6-page data sheet featuring Homelite portable electric plants which are gasoline-engine driven and furnish light and power where you want it and when you want it. Two other interesting Homelite machines are the portable 2" self-priming centrifugal pump, which comes complete with gasoline engine and weighs only 79 pounds, and also the 3" self-priming centrifugal pump, which weighs only 91 pounds complete with built-in gasoline engine. These pumps are described in new 4-page catalogs.—HOMELITE CORP., Port Chester, N.Y.

"BAY WINDOWS FOR SMALL HOUSES"—Number Three of a series of four portfolios of window ideas has been issued, consisting of five de luxe loose-leaf architectural home designs showing several novel forms of bay windows. A slipped-in vest pocket manual carries additional data for the architect, building contractor and mechanic.—DETROIT STEEL PRODUCTS COMPANY, 2250 East Grand Blvd., Detroit, Mich.

"CELOTEX AT THE FAIR"—A 20-page brochure has been prepared illustrating Celotex House No. 17 in the "Home of Tomorrow" at the New York World's Fair. It contains numerous fine photographic views, both exterior and interior, presents the floor plan, and shows just how this house is constructed.—THE CELOTEX CORP., Chicago, Ill.

WODACK "DO-ALL" HAMMER AND DRILL—An attractive broadside has been issued, illustrating almost full size this improved dual-purpose tool. Many important uses are brought out of special interest to the following: Electrical contractors, installation men, plumbing and heating men, metal workers, carpenter-contractors and erectors.—WODACK ELECTRIC TOOL CORP., 4627 W. Huron St., Chicago, Ill.

"MAJESTIC PRODUCTS—BUILDING NECESSITIES FOR THE MODERN HOME"—A new comprehensive catalog of 28 pages illustrates the extensive Majestic line, including garbage receivers and incinerators, milk and package receivers, coal doors, and coal chutes, fireplace equipment, cast iron specialties, garage door hardware, radiator furniture, air conditioning heating units and heavy-duty furnaces.—THE MAJESTIC CO., Huntington, Ind.

"RUNNING WATER" HANDBOOK—Bulletin No. 7000, 18 pages, describes the shallow and deep well pumps and water supply systems of the "Paul" line. Many of these are especially adapted to the needs of the rural builder and contractor in supplying running water for the vast number of modern homes being built outside the city limits where municipal water service is not available.—FORT WAYNE ENGINEERING & MFG. CO., Fort Wayne, Ind. *(Continued to page 116)*

Catalogs Offered

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THE NEW STRAN-DOR—An attractive 6-page folder describes this improved one-piece overhead garage door, which is noiseless in operation and presents a very attractive architectural appearance. The Stran-Dor is low in price and is easily installed. —STRAND BUILDING PRODUCTS CO., 7529 Puritan St., Detroit, Mich.

"MILCOR FURNACE PIPE AND FITTINGS"—Catalog No. 35A is a spirally bound book of 48 pages, very well illustrated, arranged, and priced for handy reference, and buying service. The index shows eight general classifications: Double Pipe and Fittings; Tin and Galvanized Pipe, Elbows and Accessories; Furnace Accessories and Heat Regulators; Single Pipe and Fittings; Return Air Fittings; Registers, Faces and Borders; Stove Pipe and Elbows; and Miscellaneous.—MILCOR STEEL CO., Milwaukee, Wis.

HART & CROUSE ROYAL "18" HEATER—A new 4-page data sheet illustrates the Royal "18" for automatic or hand-firing with all fuel. It presents in a most attractive way the construction and features of this improved home heating boiler.—HART & CROUSE CORP., 301 Turner St., Utica, N.Y.

"WESTINGHOUSE KITCHEN PLANNING MANUAL"—This 36-page book presents the kitchen planning fundamentals and standard kitchen plans for architects, kitchen engineers, builders and retailers of complete electric kitchens. Fully illustrated, the new manual is divided into three parts: (1) Fundamentals of Kitchen Planning, (2) Individaul Centers and Standard Kitchen Plans, and (3) Installation Data. Much of the material in this manual is the result of special studies and experience gained from thousands of applications by the Westinghouse Home Planning Department.—THE WESTINGHOUSE ELECTRIC & MFG. CO., Mansfield, Ohio.

"LAUX PAINTER"—This is a bright and helpful little magazine issued from time to time with up-to-date painting and building information. The leading article in this July issue is devoted to Rezitex and Plasterez, and tells how the Modern Builders, Inc., of Evansville, Ind., use these two products. Why not have your name added to the mailing list?—Laux Sales Co., I. F. LAUCKS, Inc., 314 Maritime Bldg., Seattle, Wash.

"A GUIDE FOR TRUCK DRIVERS"—Ways to cut costs and play safe are developed in a new truck driver's guide, and 8-page folders. Some of the key subjects are: Care and treatment of truck engine; how to make tires last longer; importance of proper treatment of clutch, brakes and transmission; safety and courtesy on the highway, and other topics important to truck driving.—Dodge Truck Div., CHRYSLER CORP., Detroit, Mich.

"BATHROOM FIXTURES OF CELLOWARE"—A 6-page data sheet in full color attractively presents brilliant Celloware toothbrush and tumbler holders, etc. These come in yellow, red, white, black, ivory and green. These colorful plastics unquestionably bring the new sales appeal to the modern colorful bathroom.—THE B & T FLOOR CO., Columbus, Ohio.

"DO AWAY WITH DEAD END CELLARS THIS MODERN WAY!"—This is the title of an interesting 4-page folder presenting Bilco copper steel cellar bulkheads which make home cellars safe, convenient and secure against intruders. Three types are illustrated, each available in several standard dimensions.—BILCO MFG. CO., New Haven, Conn.

"SUPERIOR FIREPLACE DESIGNS AND PLANS"—A new 48-page booklet contains 50 Superior fireplace illustrations and 30 plans of small one and two story homes and cabins. These plans show the proper location of fireplace to discharge heat into all rooms adjacent to the fireplace. In mild climates, one Superior fireplace will economically and comfortably heat four and five rooms. The booklet will help you sell the prospective home owner this economical fireplace heating unit and also other materials used for the construction of the fireplace.—SUPERIOR FIREPLACE CO., 1046 S. Olive St., Los Angeles, Calif.